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A SOURCING PROCESS EVALUATION MODEL FOR OPERATING RESOURCES

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A sourcing process evaluation model for operating resources

ABSTRACT

According to recent research, a typical large company can spend over 30 percent of its revenues on operating resource goods and services. Thus, as competition tightens, it becomes necessary to cut expenses and improve effectiveness also on sourcing and purchasing of operating resources. They refer to all purchased goods and services except raw materials and products purchased for selling.

The main objective of the study is to find measures to evaluate the effectiveness of the sourcing process. The sub-processes of the sourcing are determining specifications, supplier selection, and agreement negotiation. Effectiveness indicates the extent to which goals are accomplished (efficiency on the other hand is the measure of resource utilization). Even though literature frequently discusses the measures that can be used to evaluate the operative purchasing process, there is not much research on the measures of the sourcing process that generates the basis for the operative purchasing. The study is limited to the sourcing for operating resources.

Usually, the sourcing process for operating resources aims to, for example, standardize products and improve ordering channels in order to manage purchasing, ordering, and invoice handling as efficiently and cost-effectively as possible. On this basis, a model to evaluate the effectiveness of the sourcing process is created. In order to build the model, the sourcing process is analyzed and the most critical phases are identified. Based on these phases, measures to evaluate the process are generated. The evaluation model incorporates several perspectives according to the balanced scorecard methodology. The model that mainly consists of subjective measures is divided into three sections in line with the sub-processes of sourcing.

Based on the case studies in the empirical section, the conclusion is made that it is possible to use a generic model to evaluate the effectiveness of sourcing processes even though the scope of operating resources is wide. The conclusion is supported by the fact that the model is tested with various cases. For example, the cases analyzed vary from pure outsourcing to a case where delivery of products is combined with services, and both frame and case agreement situations are analyzed. Additionally, the geographical scope of the sourcing cases vary largely, the number of agreements negotiated during one sourcing process vary from one to many, and there are various types of pricing models in use. Still, it is possible to evaluate the sourcing processes using the same model. Some limitations are identified in the applicability of the model; for example, two sourcing cases cannot be compared with each other especially if the baselines and objectives of the cases are very different.

Keywords: Operating resources, MRO, Sourcing process, Effectiveness, Evaluation model
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Välillisten hyödykkeiden ja palveluiden hankintaprosessin arviointi

TIIVISTELMÄ

Viimeaikaisen tutkimuksen mukaan suuryritykset saattavat käyttää yli 30 prosenttia tuloistaan välillisiin hyödykkeisiin ja palveluihin. Nämä välilliset resurssit tarkoittavat kaikkia hyödykkeitä ja palveluita lukuun ottamatta myyntiin tarkoitettuja raaka-aineita ja tuotteita. Kilpailun kiristyessä on välttämätöntä vähentää kustannuksia ja parantaa tehokkuutta myös välillisten resurssien hankinnassa ja ostamisessa.

Tämän tutkimuksen tavoitteena on määritellä mittarit, joilla voidaan arvioida hankintaprosessin ulkoista tehokkuutta. Hankintaprosessin vaiheet ovat hankinnan määrittely, toimittajan valinta ja sopimuksen neuvottelu. Ulkoinen tehokkuus puolestaan viittaa siihen, missä määrin tavoitteet tavoitetaan (sisäinen tehokkuus sen sijaan mittaa resurssien käyttöä). Vaikkakin kirjallisuudessa käsitellään usein mittareita, joiden avulla voidaan mitata operatiivista ostoprosessia, hankintaprosessin mittareita ei ole tutkittu yhtä laajasti. Tämä tutkimus on rajattu käsittelemään välillisten hyödykkeiden ja palveluiden hankintaa.

Välillisten hyödykkeiden ja palveluiden hankinnassa tavoitteena on tyypillisesti standardoida tuotteet ja tehostaa tilauskanavia, jotta ostaminen, tilaaminen ja laskunkäsittely voitaisiin hoitaa mahdollisimman kustannustehokkaasti. Tästä lähtökohdasta tutkimuksessa luodaan malli arvioida hankintaprosessin ulkoista tehokkuutta. Mallin rakentamiseksi on ensin tunnistettava hankintaprosessin kriittiset vaiheet, joissa onnistuminen on välttämätöntä tehokkuuden kannalta. Näiden perusteella on mahdollista muodostaa mittarit, jotka ilmentävät useita näkökulmia tasapainotetun mittariston periaatteiden mukaan. Malli on jaettu kolmeen osaan hankintaprosessin vaiheiden mukaisesti.

Empiirisen tutkimuksen perusteella on mahdollista päätellä, että hankintaprosessin ulkoista tehokkuutta voidaan arvioida yleisen mallin perusteella, vaikka välillisten hyödykkeiden ja palveluiden kirjo on laaja. Johtopäätelmää tukee se tosiasia, että empiirisessä osassa arviointimalli testataan useiden erityyppisten hankintojen yhteydessä. Tutkitut ns. caset vaihtelevat ulkoistamisesta palvelu- ja tuoteyhdistelmän hankkimiseen, ja analyysissä on mukana sekä puitesopimuksia että puitesopimukseen perustuvia tapauskohtaisia sopimuksia. Lisäksi hankintaprosessien tavoitteet vaihtelevat esimerkiksi sen perusteella, millainen maantieteellinen lähtökohta on, monenko toimittajan kanssa sopimus tehdään ja niin edelleen. Jokaisessa tapauksessa on kuitenkin mahdollista käyttää samaa, yleistä hankintaprosessin arviointimallia. Mallin käytössä on kuitenkin joitakin rajoituksia kuten se, ettei kahta hankintaprosessia voi vertailla keskenään varsinkaan, mikäli niiden lähtökohdat ja tavoitteet ovat hyvin erilaiset.

Avainsanat: Välilliset hyödykkeet, välilliset palvelut, hankintaprosessi, tehokkuus, arviointimalli
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A SOURCING PROCESS EVALUATION MODEL FOR OPERATING RESOURCES

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1. Introduction

According to recent research (e.g., PricewaterhouseCoopers 2000; GartnerGroup 2000), a typical large company can spend over 30 percent of its revenues on operating resource goods and services. They include all purchased goods and services except raw materials (inputs to manufacturing processes) and products purchased for selling (supply chain) (e.g., Hough&Ashley 1992). As competition tightens, it becomes necessary to cut expenses and improve effectiveness also on sourcing and purchasing of operating resources that are characterized by a very extensive article assortment, high degree of specificity, low but irregular consumption rate, and user's influence on the choice of the product (Weele 1994). According to Millen Porter (1999), companies are realizing the related price-cost reductions and service improvements are great. It is said that the purchase of operating resources is often the least systematic and the most problematic areas of purchasing causing impediment to productivity (Barry et al. 1996). A study by Barry et al. (1996; also Weele 1994) reveals that even though the operating resource purchasing in many companies accounts for the majority of the purchasing activity, it still involves a minority of total expenditures. The purchase activity is measured with terms of issued purchase orders.

In order to improve the efficiency of operating resource sourcing and purchasing, companies more and more consolidate the sourcing and purchasing of these items and services under one organization utilizing company-wide agreements with approved suppliers (e.g., Carbone 2001; Millen Porter 2001). However, a typical argument against consolidated organization is that quality and service will be sacrificed to price (Millen Porter 1999) as individual business units feel price reductions will be overemphasized. Thus, the sourcing organization responsible for the sourcing process including definition of specifications of the products and services, supplier selection, and agreement negotiation, needs to authenticate and communicate the business benefits and added value gained at the end of the process. Even though literature discusses frequently measures to evaluate the operative purchasing process (e.g., Baily 1994 et al.; Weele 1994; Scheuing 1989; Mentzer&Konrad 1991), there is not much research on the measures of the sourcing process that generates the basis for the operative purchasing.

1.1 Research problem and objectives

The purpose of this study is to find generic measures to evaluate the effectiveness of the sourcing process in the area of operating resources. According to Weele (1994), the sourcing process

consists of three sub-processes that are determining specifications, supplier selection, and agreement negotiation (contracting). The end result, an agreement with the selected supplier, reflects the decisions and actions of the preceding sourcing process. The sourcing process will be discussed in Sub-chapter 2.2.

The research problem of the study can be formulated as *how to measure the effectiveness of the sourcing process?* The sub-objectives are:

1. To familiarize oneself with the elements of the sourcing process evaluation.
2. To create a measurement framework to evaluate the effectiveness of the sourcing process. Effectiveness refers to taking the right actions during the process.
3. To test the measures empirically in the case company in order to analyze the usability and the scale of generalization of the measures. For this purpose, five sourcing cases will be selected and analyzed in depths.

The sourcing process is not separate and dispersed but it is followed by operative purchasing activities. According to Weele (1994), this so-called supply process consists of ordering, expediting and evaluation, and after-care and evaluation. Additionally, the selected supplier is managed and various measures are used to follow-up the operations, such as, delivery performance, level of service, quality, and number of invoices sent. The order function is not in the scope of this study even though it may provide essential information for the sourcing organization and for future sourcing activities. This is the first limitation in the scope of this study. Second, the study is limited to the sourcing of operating resources that according to Kraljič (1982) are noncritical items with low supply risk and low profit impact. Kraljič's purchase portfolio will be presented in Sub-chapter 2.1. Third, the intention is to find the most critical themes and build measures related to those themes in order to evaluate the sourcing process. Thus, the intention is not to try to list all sourcing activities and related measures.

1.2 Research methodology

The study is organized as follows. First, the elements for the sourcing process evaluation are investigated in order to understand the context where the evaluation model will be used. This section introduces characteristics of operating resources, presents a generic description of the sourcing process based on literature, and reports a generic measurement framework (the balanced scorecard). Second, a measurement framework for the sourcing process for operating resources is created based on findings in the literature. The intention is to find the most critical

phases of the process in order to analyze its effectiveness. The model is complemented with findings from practical sourcing and thus, before the model will be taken into practical usage, it will be commented by sourcing professionals and complemented accordingly. This approach was chosen due to characteristics of operating resources; the sourcing process as presented in the literature is a generic model that may not perceive all aspects and emphasize similar tasks as would be emphasized in case of sourcing for operating resources. The measures will be built on the basis of the critical phases reflecting the balanced scorecard (BSC) methodology in order to incorporate several perspectives in the model.

Third, the model will be tested in the empirical part. For this purpose, five sourcing cases will be evaluated and analyzed in the case company. These sourcing cases will be selected in a way they present comprehensively the wide area of operating resources. The analysis will be based on themed interviews of the main responsible person of each sourcing case. This methodology was chosen in order to assure the questions are answered in a similar scale and to collect feedback on the applicability of the model. Finally, conclusions of the usability and generalization of the evaluation model are drawn.

This paper is divided into six chapters. Chapter 1 introduces the topic and research approach, and defines key concepts of the study. Chapter 2 presents the elements for the sourcing process evaluation. In Chapter 3, a model to evaluate the sourcing process in the area of operating resources is built. The evaluation model is tested in the case company, and the results are presented in Chapter 4. Conclusions drawn from the empirical part are discussed in Chapter 5. Finally, Chapter 6 summarizes the study and its findings. The structure of the study is summarized in Figure 1-1.

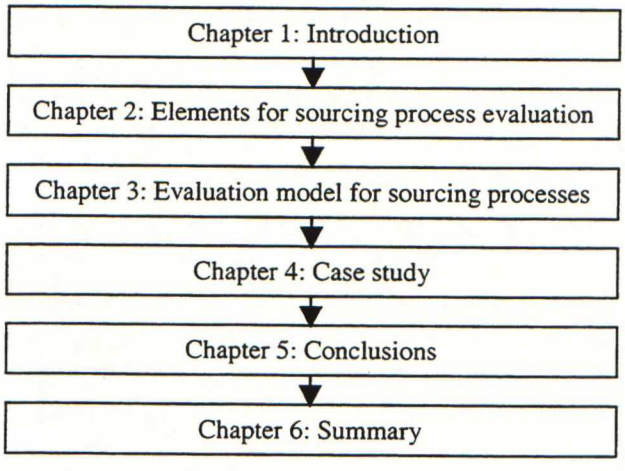

Figure 1-1: Structure of the study

1.3 Definitions

Key definitions as they are used throughout the study are defined below. Additionally, all abbreviations are glossed in Appendix 1.

Agreement. An agreement is the end result of the sourcing process. In this study, terms frame agreement and case agreement (or project order) are used. A frame agreement is a type of long-term agreement to provide products or services according to defined conditions. A frame agreement provides standardized general conditions and adds certainty by both seller and buyer as by using the same conditions over a long period of time, the clarity, fairness, and efficiency of the provisions will be tested and areas of deficiency will be identified and subsequently corrected. Additionally, as both parties are better familiar with the provisions, time and effort needed to review the agreement documents are likely to reduce (Fleischer et al. 1999; Bubshait&Almohawis 1994). So-called case agreements utilize the generic terms and other conditions available in the frame agreement. An individual case agreement covers the requirements of a specific case, whereas a frame agreement aims at to be generic enough to allow details to be negotiated for each case separately. A contract is a synonym for an agreement.

Company-wide agreement. The term company-wide agreement can have several meanings for a multinational company. It can be an agreement used by all business groups of the company in one country; in a country-scale the agreement is company-wide. In the optimum, a company-wide agreement is multi-national or even global, and thus utilized by all business groups in several countries.

Customer. For the strategic sourcing organization, the customer is internal (within the same company or group of companies). Customer is anyone, an individual or an organizational unit, in need of operating resources. A term "external customer" refers to a customer outside the company (such as, an organization or even an individual consumer).

Effectiveness. Effectiveness means answering to question, "Are we doing the right things" instead of, "Are we doing them right" (Baily et al. 1994). According to Weele (1994), sourcing (purchasing) effectiveness is defined as "the extent to which, by choosing a certain course of action, a previously established goal or standard is being met". Mentzer and Konrad (1991) define effectiveness as the extent to which goals are accomplished (efficiency on the other hand is the measure of resource utilization). An action is effective if a goal is reached. Sometimes effectiveness is referred to as external efficiency. One of the purposes of this study is to evaluate the effectiveness of sourcing, i.e., are the right actions taken during the process. It can be said an effective sourcing process results in a successful end result, an agreement.

Operating resources. Operating resources refer to all items and services that are not used directly in the production and that are not purchased for on selling (e.g., Hough&Ashley 1992). The term operating resources is mainly used in this study but terms indirect materials, consumable items, non-production related (NPR) products and services as well as maintenance, repair, and operations (MRO) are commonly used in literature. Barry et al. (1996) divide MRO goods into three classes: 1) actual maintenance, repair, and operation supplies necessary to support production and service operations, 2) office products including consumable supplies, small equipment, leased equipment, and fixtures, and 3) small, unscheduled capital goods purchases.

Purchasing. Purchasing means actions that are made in order to buy goods or services. According to Parsons (1982, 1), the primary objectives of purchasing include obtaining the "right quantity of right materials or services at the right quality at the right time from the right source at the right price". A synonym for purchasing is buying, and it consists of processing requisitions, placing orders and calling off agreements, follow-up, receipt of goods, and other daily activities. Term procurement is used in some references.

Services. Services are activities that are executed by third parties, for example, by suppliers or engineering firms, on an agreement basis. Services range from providing cleaning services and hiring temporary labor to having a new facility designed for a company by a specialized engineering firm (Weele 1994).

Sourcing. Sourcing means strategic activities that aim at the optimum mix of qualified suppliers, sources of supply, products, terms and conditions, quality, and price in order to ensure maximized profitability (Parsons 1982; Barry et al. 1996). Strategic sourcing decisions are usually done in cooperation with departments across the company. Strategic sourcing is defined by Slaight (1999) to be a "periodic event that includes the identification and selection of initial commercial arrangements with a selected supplier that either creates or resets a relationship". In some references, the word "purchasing" is used but in case the term is used in a strategic context, "purchasing" has been replaced by "sourcing" in this study. Strategic sourcing requires that spend of the organization is divided into categories and the categories are classified based on the importance of that product or service and on the complexity of the supplier marketplace. Further on, the purchasing organization - and the supplier organization - must recognize that various relationships are required based on cost, for example, but at the other end, the most strategic suppliers are chosen for their ability to create new business opportunities or technological advances (Slaight 1999). The sourcing process that forms the base for the study can be divided into sub-processes each consisting of various actions. Weele (1994) divides the sourcing process into three: determining specifications, supplier selection, and agreement negotiation (contracting).

2. Elements for sourcing process evaluation

In this chapter, the elements of the sourcing process evaluation are discussed. The aim is to identify the elements affecting the evaluation of the effectiveness of the sourcing process and to understand the context where the model will be used. In the following, we will first shortly discuss the characteristics of operating resources. Secondly, the sourcing process is described. Then the measurement systems are discussed in order to understand characteristics of good measurement systems as well as the methodology for multi-dimensional measuring.

2.1 Operating resources

As described in the definitions, operating resources refer to all items and services that are not used directly in the production and that are not purchased for selling. Kraljič (1982) has created a matrix that allows evaluating the supply situation for any type of item in two dimensions. The dimensions of this so-called purchasing portfolio are supply risk (availability) and profit impact as presented in Figure 2-1. The main factors determining item's location on the supply risk dimension are number of suppliers and their geographical distance that are able and willing to supply a particular item. Profit impact on the other hand is mainly determined by the buyer's current purchase volume as well as forecast of the future. Based on the model, it is possible to categorize items and formulate the purchasing strategies accordingly (Koskinen et al. 1995).

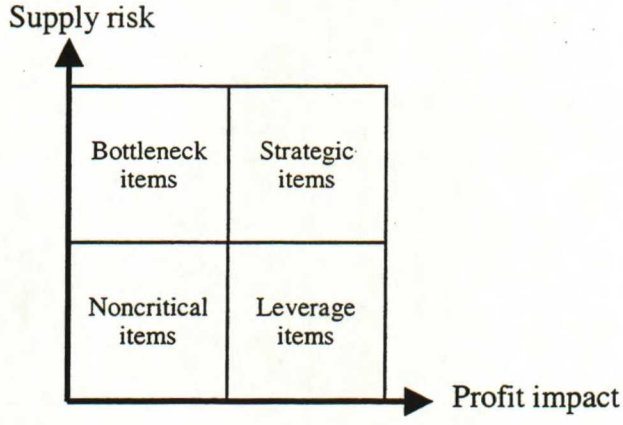

Figure 2-1: Purchasing portfolio (Kraljič 1982; Knudsen et al.)

This study is limited to operating resources that are typically noncritical items with low supply risk and low profit impact. The lower-left corner implicates these items that are usually bought in small quantities from local suppliers (Koskinen et al. 1995). Furthermore, specificity and number of purchase items are high, consumption rate is low but irregular, and user's influence on the

choice of the product can be remarkable (Weele 1994). Thus, the main objective is to manage purchasing, ordering, and invoice handling as efficiently and cost-effectively as possible.

One of the main actions for purchasing management in the case of noncritical items is to standardize products (Kraljič 1982) but also other forms of standardization can take place. Key actions include also developing purchase and delivery routines, comparison of offers, and negotiation of frame agreements. Electronic ordering channels are likely to be used for noncritical items, and automated ordering can take place by end users (without intervention by the purchasing department) (Koskinen et al. 1995). The savings potential related to the daily, operative activities could be significant. For example, if purchases are made online via efficient ordering channels supporting standard order-delivery processes, administrative costs and cost per transaction are usually reduced and with integrated tools it is possible to achieve significant enhancements in the process due to timesavings. Manually placing an order for office supplies, for instance, takes about 25 minutes, but performing the same activity electronically can be done in less than five (Purchasing Magazine Online, December 1999). Avery (2001) supports the findings and notes, technology has an important role in operating resource sourcing and purchasing by reducing lead-times and transaction costs and providing purchasing with capability to leverage higher volumes. It is said that electronic capabilities can overcome barriers companies face in category data knowledge, performance measurement, and process standardization (Avery 1999).

Other means to rationalize purchasing management is consolidation. According to Fleischer et al. (1999), the benefits of consolidated purchasing (i.e., consolidating the number of suppliers and using the same agreements throughout the company) result from greater internal efficiency and reduced cost of the purchasing function itself, greater purchased volume from a given supplier (volume concentration), and usually also closer relationships with suppliers that involve more open communication. However, it is "essential that for all purchased items of high annual usage value, an alternative source of supply is known, even if not used" (Parsons 1982, 57). Excessive consolidation is to be avoided especially in case of critical products and services.

An interesting phenomenon related to operating is maverick buying. Maverick buying is the opposite of standardized purchasing process where people order items from non-contracted suppliers outside the established process. The cost of maverick spending is difficult to estimate. Commonly the buying organization ends up paying more for goods and services than they should as pre-approved suppliers who are under agreement to sell products at a negotiated price (that

usually includes a volume discount) are not used. Maverick buying is common in the purchasing of operating resources due to number of purchase items and number of purchase orders submitted (Sheridan 2000; Markee 2000). An extensive but carefully determined product and service portfolio is likely to reduce maverick buying as customers find the product and service portfolio offered is comprehensive enough.

2.2 The sourcing process

This sub-chapter describes the sourcing process that aims to reach an agreement with a selected supplier. According to a definition by Weele (1994), the sourcing process is composed of three key elements. First of all is determining the specifications in terms of quality and quantities of the goods and services to be bought. The second element is selecting the most suitable supplier. The third element is agreement negotiation (also referred to as contracting) that involves preparing and conducting negotiations with the supplier in order to reach an agreement. These are presented in Figure 2-2 together with the supply process. The supply process is subsequent to the sourcing process and consists of ordering, expediting and evaluation, and after-care and evaluation. The supply process carries out and follows up the decisions made in the sourcing process.

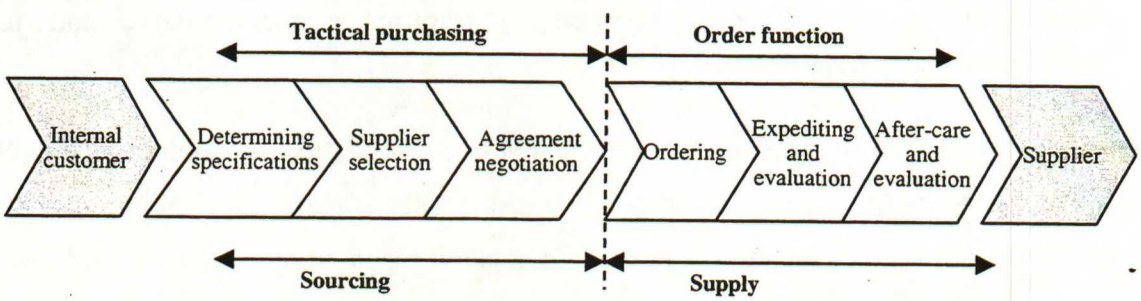

Figure 2-2: Sourcing and supply processes (Weele 1994, modified)

In addition to the foregoing, sourcing is responsible for the development of staff, policies, procedures, and organization to ensure the achievement of the specified objectives (Baily et al. 1994). The sourcing process can be time-consuming and complicated but once an agreement exists, the customer in need of certain, for example, services can rely on the generic terms of the agreement. Thus, the internal processes and efficiency are likely to improve as time and effort needed to make an order will reduce.

In the next paragraphs, the sub-processes of the sourcing are described.

2.2.1 Determining specifications

During the stage of determining specifications, the purchasing requirements are determined and also the decision of "make or buy" is to be made. In the latter decision, the company decides which products or activities to produce or perform internally and which will be contracted out. If the company decides to "make", there is no need to continue with the sourcing process. Thus, the following applies to a "buy" decision only.

According to Weele (1994), there are various types of specifications. *Functional specification* describes the functions the product or service must fulfill for the user. This type of specification gives potential suppliers the best possible opportunity to contribute their expertise, allows new technologies to be used, and creates one standard against which all concepts can be evaluated. Detailed *technical specification* describes the technical properties and product characteristics. Koskinen et al. (1995) introduce a so-called model of the four C's that forms a useful framework for evaluating sourcing. The four C's are configuration, channel, care, and cost. *Configuration* relates closely with Weele's (1994) determination of specification. Configuration in the "4C's" context means overall acquisition. The right definition of customer needs is the first cornerstone of effective sourcing, and in order to succeed, these needs are to be transferred to supplier requirements. In the configuration phase, the specifications of the physical product together with related services are defined including, for example:

- Functionality meaning technical suitability and product characteristics;
- Quality including specifications for attributes such as accuracy, reliability, and technical quality;
- Technology for the product and manufacturing;
- Innovations, such as new products, upgrades, design, and user-friendliness;
- Compatibility with other products.

The specifications have to correspond to customer requirements (Koskinen et al 1995).

Logistic and maintenance specifications in Weele's (1994) framework describe how the product should be delivered, the conditions in which the product will be processed or the equipment has to operate, and requirements concerning maintenance and after-sales service. In the "4C's" model (Koskinen et al. 1995), *channel* decisions are connected to the logistic and maintenance specifications. In this phase, issues relate to, for example, the use of various channels and intermediates in order to guarantee efficient operative purchasing. Channel functions include, for example, management of integrated logistics, policies for delivery and delivery terms as well as for inventories and customer service level, and risk management (Koskinen et al. 1995). In the

"4C's" model, the concept of *care* relates to maintenance specifications as the question to be asked is: "How well does the supplier serve myself and my customers?" Factors that contribute to care include, for example, service level, quality and availability of service, supplier's ability to communicate, and flexibility. Additionally, supplier's will to share information on new products, technologies, and designs as well as their will to cooperate and improve both common and internal processes are part of the care element (Koskinen et al. 1995).

2.2.2 Supplier selection

Supplier selection process starts after the purchasing requirements have been defined in the specifications. The first issue to be dealt with is the method of contracting out. In this phase, a decision is made between integral contracting out and partial contracting out. In the case of *integral contracting out* the supplier is responsible for the entire assignment (often including design activities). In the case of *partial contracting out* the assignment is divided into parts which are contracted out separately (often to various suppliers), and the buying company is responsible for coordination (Weele 1994).

The second issue to be considered is the payment method, i.e., whether the work will be awarded on a fixed-price or a cost-reimbursable basis. Advantages of *fixed-price* include that the buying company knows its financial situation exactly, there is a firm completion date of the work, and after completion there is no need for settlement as the supplier carries all risks. For the supplier, a fixed-price agreement provides motivation to perform efficient, good-quality work. On the other hand, it is difficult for the buyer to evaluate supplier's cost breakdown without deep expertise (the problem can be lessened if quotations are asked from several suppliers). When a *cost-reimbursable* basis for awarding is used, the nature and scope of the activities to be performed are not established in advance. Instead, the buying company orders the supplier to perform certain activities at a predetermined hourly rate. In this case, settlement follows after completion of the activities based on the supplier's reports (stating, for example, man hours worked or materials used). In the method of cost-reimbursement, the buying company obtains a clear picture of the cost structure and is free in the choice of suppliers. Disadvantages include, for example, imperfect knowledge of the financial consequences as there is no fixed price, uncertain completion date, and the fact that the buyer does not have to make exact specifications (Weele 1994).

The choice between the two payment methods is determined by a number of factors. Weele (1994) lists comprehensiveness of the specification as the first factor. The availability of

extensive specifications is an important prerequisite of fixed-price agreement as without specifications it is impossible to compare quotations. The second factor is time available: it takes longer to go over quotations and price negotiations when a fixed-price agreement is in question. Thirdly, technical expertise affects the selected payment method. If special knowledge and skills are needed in the work, a cost-reimbursable agreement is often preferred. Finally, the fourth factor is buyer's knowledge of the industry and the methods and price arrangements operating.

Once the contracting and awarding methods have been decided, the requirements are summarized. After pre-qualification, a so-called bidders list indicates which suppliers will be invited to bid; the list may contain current, approved suppliers but also a market research may be needed in order to find suitable bidders. In the case of new suppliers, a thorough auditing is performed to rate the supplier. A quotation is typically asked from three to five suppliers but in case a more thorough market scanning is wanted, more requests for purchase (RFP) can be sent to suppliers (Weele 1994; Koskinen et al. 1995). Preparing an RFP is a challenging task, because not only need the specifications be clear but also an RFP provides also a basis for quotations and enhances their comparability. Koskinen et al. (1995) note an RFP shall be unambiguous and detailed enough in a way a receiver is able to get all needed information and to quote accordingly. Weele suggests a ranking method where the major technical and commercial criteria are determined in consultation with the users before the quotations are sent out. Later, the quotations are evaluated against the ranked criteria that have been weighted or given a value factor. The ranking method gradually moves the user and the sourcing organization towards a joint decision.

The next stage in the supplier selection is to evaluate the received quotations from technical and commercial point of view. Weele (1994) suggests a total cost of ownership (TCO) approach in order to evaluate integral costs in the long term. In the "4C's" model of Koskinen et al. (1995), total life cycle cost is one of the elements contributing to effective sourcing. These are in line with Baily et al. (1994) who stat that when the role of purchasing changes from reactive buying to proactive buying, the focus will change from price as the key variable to total cost and value. According to Ellram and Siferd (1993), the sourcing activities contributing to the total cost of ownership (TCO) are management, delivery, service, communications, price, and quality. Thus, all costs associated with the acquisition, use, and maintenance of an item are considered in evaluating that item, such as, first cost, installation, financing, commissioning, energy, repair, and maintenance costs as well as consumption in units. Other costs that have a bearing on overall value are productivity costs, risk cost, warranty cost and disposal costs (Ellram&Siferd 1993;

Purchasing April 2000; Fleischer et al. 1999). Ellram and Siferd (1993) note that paying the supplier a lower price may increase the TCO, particularly in areas such as delivery reliability, quality, and after-sale service.

The sourcing activities contributing to the TCO are presented briefly in the following.

Price related activities include negotiating terms of agreement with respect to quantity, quality, delivery conditions, freight costs, purchase discounts, agreement length, and degree of coordination and cooperation (Ellram&Siferd 1993). Direct costs of products and services are likely to decrease with a company-wide sourcing approach. This is mainly due to, for example, larger purchasing volumes that are consolidated with fewer suppliers. When a price is evaluated, comparisons can be made with supplier's list prices, with current prices paid by the buyer, and with the quoted prices of other suppliers. Additionally, comparisons with historical prices, industry average prices, and "best in class" prices can be made. Further, an analysis of supplier's cost structure and cost trend of the industry can be beneficial as it may be possible that reductions in, for example, raw material prices are not passed on to unit prices but on the contrary, unit prices are increased (Baatz 1999; Hough&Ashley 1992; Koskinen et al. 1995). Baatz (1999) especially encourages keeping an eye on price and cost trends of the industry that supplies raw materials for certain operating resources products. Baatz argues that sometimes suppliers do not pass the raw material price reductions on to the buyer but instead keep increasing their unit prices. Baatz continues that if a supplier passes the savings on to the customer, the customer will benefit from reduced prices, and the supplier will benefit from a better bargaining position in the future.

Based on Ellram and Siferd (1993), activities related to *quality* are the following: select and approve suppliers, evaluate supplier performance, understand suppliers' processes, maintain supplier relations, acquire parts for rework, return rejected parts, inspect incoming materials, and dispose of scrap. All these are considered during the sourcing process. As noted by Reese (2001), a low-cost supplier might not be certified, and the quality of the products and services might not attain certain standards meaning additional work for the buyer (including, e.g., inspection and return and replacement of defective items). Failures in quality, such as delivery, can outweigh any price or discount advantages. Thus, quality improvement is often prioritized in supplier relationships (Weele 1994). Parsons (1982) classifies three types of costs related to quality: costs of prevention that incur in avoiding the incidence of failure in meeting specification requirements (e.g., costs of vendor survey and evaluation); costs of detection that involve in checking and validating the fact that requirements have been met (e.g., inspection upon receipt); and costs of correction that incur in compensating for the fact that specified quality has not been achieved (e.g., costs of rejection or scrap). When quality is measured, the aim could be at early sourcing involvement in design and development as specifications are means to define quality (Weele 1994; Scheuing 1989). The benefits of early involvement are, for example, coherent product specifications throughout the company furthering asset utilization.

Delivery related activities contributing to the TCO include accepting deliveries and partial shipments, expediting late orders, and arranging for correction of incorrect orders (Ellram&Siferd 1993). As part of the TCO, an agreement can be evaluated based on its contribution to the improvement of lead-times. As Kaplan and Norton (1996c) note, lead-time affects the TCO in many ways, for example, large delivery quantities require

extensive storage space as well as receiving and handling resources. Additionally, capital is tied to the goods in the stock.

Activities related to *service* are an essential part of the TCO. Ellram and Siferd (1993) list activities such as oversee installation of equipment and maintenance, order parts for warranty repairs, involvement in customer training, maintain spare parts inventory, supply service manuals, conduct product recalls, respond to complaints, and general trouble shooting. According to Purchasing magazine (June 2000), buying services instead of plain products is likely to benefit both parties as a supplier can capture a greater percentage of their customer's total spend and may be able to create entanglements that limit buyer's desire to change supplier when the new "best deal" arises. The buyer on the other hand would receive a complete package allowing them to concentrate on their core business.

According to Ellram and Siferd (1993), *management* related activities are determination of purchasing strategy in conjunction with corporate strategy, managing personnel, coordinating with other functions, training of personnel, ongoing process changes, and professional development.

Communications related activities are said to include updating forecasts and communication to suppliers, preparation and sending purchase orders, maintaining purchasing information systems, matching purchase order with receipts, making invoice adjustments, and maintaining inventory records (Ellram&Siferd 1993).

Once the quotations are analyzed, a risk analysis in terms of technical, quality, and financial aspects is made for critical suppliers and purchase parts. Eventually, a supplier will be selected with whom the delivery of the product/service is to be negotiated. Those suppliers, who were not selected, will be informed (Weele 1994).

The supplier selection process is summarized in Figure 2-3.

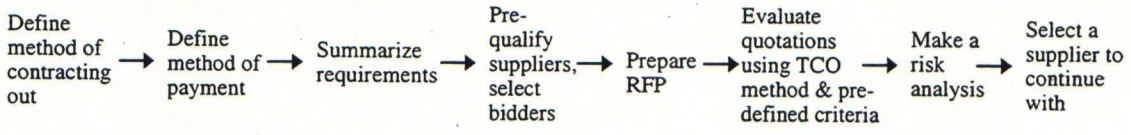

Figure 2-3: Supplier selection process

2.2.3 Agreement negotiation

The final stage of the sourcing process is to negotiate the agreement (referred to also as contracting). According to Weele (1994), there are prices, terms of payment, terms of delivery, penalty clauses, warranty conditions, and other arrangements to be agreed. The details discussed are typically included in the generic purchasing conditions of a company, and they are used in all agreements whenever applicable and accepted by the supplier.

Financial obligations need to be unambiguous and accepted by both the buyer and the supplier. In Weele's opinion (1994), the buyer in general should insists on a fixed price as it allows

improved cost control and budget management and places risks to the supplier. Other types of price arrangements are, for example, cost-plus agreement, cost-reimbursable agreement, and agreement with price-adjustment (escalation clauses). Some agreement types used in the area of operating resources are presented in Table 2-1. The terminology may vary from reference to reference.

Table 2-1: Examples of agreement types used in operating resources

Blanket order	An agreement that covers one or more commodities for one or more users, usually to be formalized by a purchase order. All the usual conditions (such as price and quality) are established, with the exception of the quantities to be delivered (Weele 1994).
Call-off agreement/open end agreement	Generally specifies prices, terms, conditions, and the period covered, but not necessarily the quantity. Shipments are made against the buyer's released purchase orders (Weele 1994).
Requirements agreement	Covers long-term materials requirements, which is used when the total quantity required cannot be fixed definitely, but can be stated within maximum and minimum limits, with deliveries at request (Weele 1994).
Standing order	Standing arrangement with a supplier to deliver goods or to service equipment at prices agreed for a certain period (Weele 1994).
Systems contract (consignment agreement)	Usually covers a plant or department's requirement for operating resource supplies and requires a high degree of integration between the supplier and the buying organization. It generally provides for the supplier to carry inventory and to make regular, timely deliveries, generally used for reduction of administrative work. Weele (1994, 74) gives an illustrative example of a systems contract: first, a particular assortment (e.g., office supplies or electro-technical articles) is determined. Then ordering routines are established which, as a rule, means that the internal users can order directly from the supplier (often through a product catalogue). Together with the ordering routines, a specific service level is agreed with the supplier. Finally, the supplier invoices the administration, for example, once a month. Benefits of the systems contract include prevention of unnecessary work and avoidance of the so-called small-order problem of purchasing departments.
Voucher system	Used sometimes for the purchase of operating resource articles. An annual agreement is made with a supplier, and the expected turnover and the purchase discount are agreed upon. The internal users can collect the required articles directly at the supplier's premises on presentation of a voucher. The advantage is simplicity as it is not necessary to place an order each time something is needed, and the conditions are determined periodically (Weele 1994). According to a study by Visa International (Purchasing February 1999), companies that use *purchasing cards* are reducing their invoice processing costs by about 73%. The use of purchasing cards is likely to improve control over the purchasing process and to streamline and simplify paperwork thereby cutting costs.

Integrated supply agreement	A distributor provides a high level of service in supplying an entire line of products at agreed-upon prices. Agreement type resembles a systems contract. Integrated supply agreement often offers a wide range of products for which the distributor assumes most of the responsibility for stocking, reordering, and forecasting future needs. Other activities included in the agreement can be, for example, on-site personnel receiving, managing, and issuing product, technical support, redesign for the purchasing process, and sourcing of non-inventory items. Integrated supply agreements vary widely and, for example, it could mean a distributor manages a storeroom or it could mean outsourcing the entire operating resource buying activity to a distributor or consortium of distributors. Integrated supply agreements tend to reduce the number of suppliers, to streamline internal processes (e.g., ordering and invoicing), to reduce inventories, to expand value-adding services (e.g., JIT deliveries), and to improve transaction processing with advanced technology (e.g., buying on the internet). Companies in the process industries, who have high volume of operating resources and low cost reduction opportunities on raw materials and capital equipment, have shown most interest in integrated supply agreements. (Morgan 1999; Purchasing January 2000).
Outsourcing	One of the trends in operating resource purchasing is outsourcing the entire buying function (Avery 2000). Outsourcing refers to a case where the supplier/service provider is not part of buyer's own organization (Koskinen et al. 1995). As mentioned, outsourcing is a type of integrated supply agreement.

There are several types of terms of payment. Weele (1994) lists a payment in several terms, a payment based on supplier's performance, and an advance payment. In each case, an analysis on the influence of the terms of payment on the final price is required. Subsequent to agreeing the terms of payment, the transfer of ownership is agreed (e.g., intellectual property rights).

Terms of delivery define they way risks and duties to act change, and they way delivery costs are distributed between the buyer and the seller. Unambiguous, international delivery terms, such as Incoterms 1990, are recommended to be used to define responsibilities (Koskinen et al. 1995).

Penalty clauses and warranty conditions manage the risks that exist once the agreement is carried out. If a supplier, for example, does not meet agreed quality or performance, penalty clauses can limit the consequences as the procedure of correcting actions has been agreed in advance. Weele (1994) continues that in some cases a penalty is not enough but the buyer will have to have the right to refuse the product or installation in question (in the case where, e.g., performance is found to be more than 5% under the agreed standard). Warranty conditions define the period during which the supplier is liable for the reliability and adequate functioning of the delivered goods in the specified circumstances. Additionally, warranty conditions define the milestone

when the warranty comes into effect. They may also define the period during which the supplier is responsible for providing maintenance for the products (Weele 1994).

When standardized terms and conditions are used, the benefits for the buying company include, for example, more simplified analysis of bids, stronger negotiation position, and reduction in negotiating time (Heinritz et al. 1991).

2.2.4 Post-sourcing

The sourcing process results in the agreement and is followed by the supply process (operative purchasing or order function) as was presented in Figure 2-2. The supply process carries out the results of the sourcing process and consists of ordering, expediting and evaluation, and after-care and evaluation (Weele 1994). Thus, the sourcing process is not separate and dispersed. However, the sub-processes of the order function are not discussed further even though they usually provide essential information to be used by the sourcing organization in future sourcing activities. For example, supplier's service level, product quality, and number of received invoices can be measured in actual terms and used as a baseline when the agreement is revised. The metrics of the supply process are frequently discussed in literature (e.g., Baily et al. 1994; Weele 1994; Scheuing 1989).

2.3 Measurement systems

In this sub-chapter, the measurements systems are discussed in order to understand how the evaluation model should be built. First, the characteristics of good measurement systems are discussed. Second, the concept of balanced scorecard (BSC) is introduced as a methodology for multidimensional measuring.

2.3.1 Characteristics of good measurement systems

The ultimate goal of any measurement system is to guide and influence the decision making process. Motivation for measurement is given by Harrington (1991) as follows: "If you cannot measure it, you cannot control it. If you cannot control it, you cannot manage it. If you cannot manage it, you cannot improve it." Measures are needed to assess current performance, set goals for improvement, and understand what is important to create value in the future. Metrics are good if the decisions and actions that improve the metrics also improve the long-term outcomes of the firm (Caplice&Sheffi 1995; Hauser&Katz 1998; Gooderham 2001). According to Mentzer and Konrad (1991), good measures cover all aspects of the process being measured, are

appropriate for each situation, minimize measurement error, and are consistent with reward systems.

Kaplan and Norton (1996b) define that the multiple measures on a balanced scorecard should consist of a linked series of objectives and measures. The chain of cause and effect should cover all the perspectives of a BSC and eventually, causal paths from all the measures on a BSC should be linked to financial objectives (Kaplan&Norton 1996b). An example of the causal relationships among employee and customer satisfaction, customer loyalty, market share and eventually financial performance is presented in Figure 2-4. The BSC concept is presented in Paragraph 2.3.2.

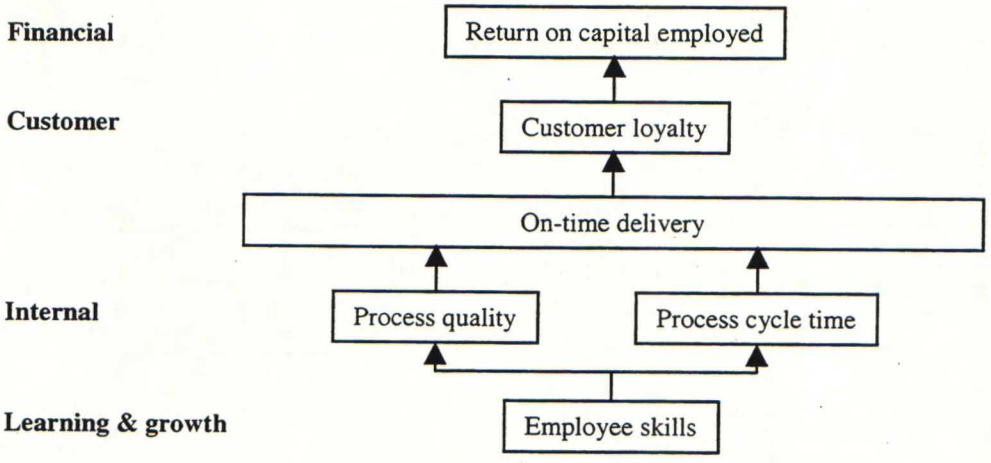

Figure 2-4: Example of the causal relationships among BSC perspectives (Kaplan&Norton 1996b)

Caplice and Sheffi (1995) have found four common principles concerning performance measurement systems. First, a measurement system should be comprehensive and capture performance from more than one perspective (balanced measuring is discussed more in the following paragraph). Second, the system should be causally oriented and capture the drivers of performance rather than just the end results. Third, it should be vertically integrated and link overall corporate strategy to the decision-making. Finally, performance measurement system should be horizontally integrated or aligned along process rather thank with each function or department.

2.3.2 Multidimensional measuring - the balanced scorecard

The balanced scorecard (BSC) is used as a methodology to evaluate the effectiveness of the sourcing process. With four perspectives the BSC balances short- and long-term objectives and the "hard" objective measures and "softer", more subjective measures (Kaplan&Norton 1996c).

In this study, the scorecard is used as a methodology to consider both financial and non-financial measures.

The four BSC perspectives are

- Financial,
- Customer,
- Internal business process, and
- Learning and growth.

These perspectives and their interrelations are presented in Figure 2-5. These perspectives are not commensurable (Laitinen 1998).

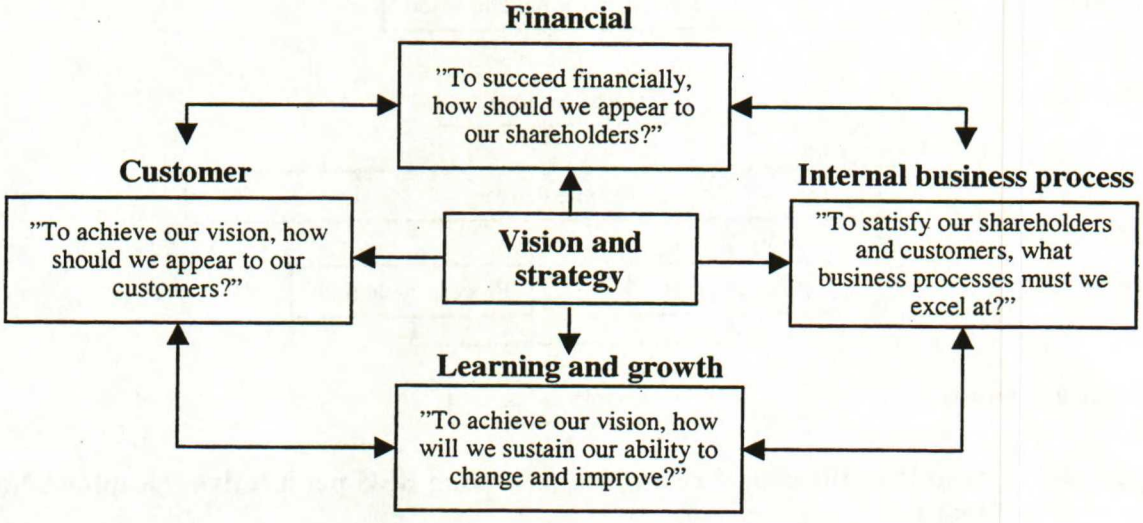

Figure 2-5: Translating vision and strategy: Four perspectives (Kaplan&Norton 1996a)

In the following, the main points of the BSC perspectives are described on a generic level.

Financial perspective

The financial measures summarize the measurable economic consequences of actions already taken. Kaplan and Norton (1996c; 1993) express the financial objectives and measures define the financial performance expected from the strategy and on the other hand, they serve as the focus for the objectives and measures in the other three scorecard perspectives.

In order to achieve their business strategies, companies use four financial themes that are

- Revenue growth and mix,
- Cost reduction and productivity improvement,
- Asset utilization, and
- Risk management.

Revenue growth and mix refer to expanding service and product offerings and re-pricing them, changing the product and service mix towards higher-value-added offering, and reaching new customers (Kaplan&Norton 1996b). The most common measures include, for example, sales growth rates and market share for targeted regions, markets, and customers as well as percentage of revenue from new products and services in a given time period (Kaplan&Norton 1996c).

Cost reduction and productivity improvement mean efforts to lower the direct costs of products and services, reduce indirect costs, and share common resources with other units (Kaplan&Norton 1996b). Competitive cost levels, improved operating margins, and monitored indirect costs enhance higher profitability and return on investment ratios. For example, electronic ordering channels are likely to improve the process and cost efficiency in comparison with the manual process and channels. Thus, shifting customers and suppliers from high-cost manually processed channels to low-cost electronic channels may reduct costs. Objectives to reduce spending and expenses levels are to be balanced by other measures so that cost cutting does not interfere with achieving important customer and internal process objectives. According to Mentzer and Konrad (1991), much attention has been devoted to the minimization of costs and the maximization of customer service levels in the area of logistics. However, if the management wants to reduce administrative expenses, the objective has to be in line with other objectives like customer responsiveness, quality, and performance.

Asset utilization refers to reducing the working and physical capital levels required to support the volume and mix of business and to obtaining greater utilization of the fixed asset base (Kaplan&Norton 1996b). Working capital (e.g., accounts receivable, inventory, accounts payable) is an important element of capital for many companies. One measure of the efficiency of working capital is the cash-to-cash cycle that is the difference between payment to supplier and collection of cash from customer measured in days (Kaplan&Norton 1996c). The means to reduce the cash-to-cash cycle include matching inventories closely to final sales, collecting quickly from customers, and negotiating favorable terms with suppliers. Physical capital, such as infrastructure investments, leverage can be increased by, for example, sharing them across multiple business units (Kaplan&Norton 1996c).

Risk management is the last aspect in the financial theme. In addition to increasing returns (through growth, cost reduction, productivity, and asset utilization), companies are also concerned with the risk and variability of the returns. For example, if a company feels it is too

dependent on one specific customer, it could set an objective to enlarge the share of revenues from other customers.

Customer perspective

The customer perspective is designed to incorporate customers' feedback regarding their expectations of the value proposition being offered (Brewer&Speh 2001). The generic measures of the customer perspective are discussed below. They include

- Customer satisfaction,
- Customer retention,
- New customer acquisition,
- Customer profitability, and
- Market and account share in targeted segments (Kaplan&Norton 1996c).

The linkage between customer and financial perspective is clear: in order to achieve good financial performance, a business must offer services and products that are valued by customers (Kaplan&Norton 1996c). Customers may have different value preferences. For example, if price is the most meaningful factor customers are in search of the best price even though it would mean a compromise in the functionality of the product or service (Kaplan&Norton 1996b).

The generic measures can be grouped in a causal chain of relationships as presented in Figure 2-6. Each of them is discussed in the following.

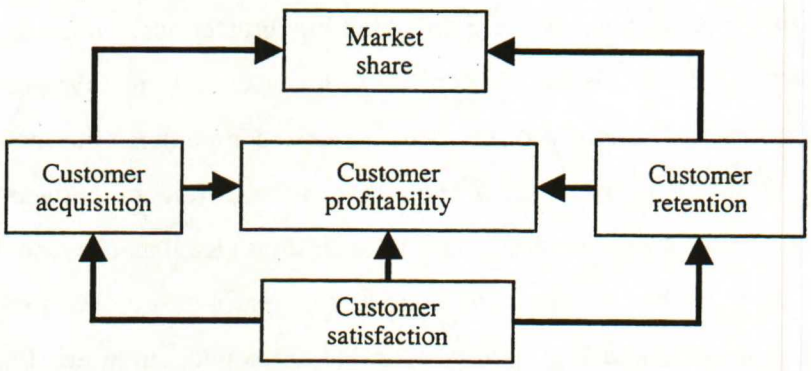

Figure 2-6: The core measures of the customer perspective (Kaplan&Norton 1996c)

First, customer satisfaction related measures provide feedback on how well the company is doing along specific performance criteria. Customer satisfaction impacts the other three aspects of the customer perspective even though adequate customer satisfaction rate does not automatically mean a high degree of customer loyalty, retention, and profitability (Kaplan&Norton 1996c). Customer satisfaction is usually measured with customer satisfaction surveys.

The second measures relate to customer retention (customer loyalty). It can be measured, for example, with the percentage growth of business with existing customers and with the rate that customers return to make business with a company (Kaplan&Norton 1996b).

Thirdly, new customer acquisition can be measured in terms of number of new customers or the total sales to new business or customer segments. The measures can be absolute or relative (Kaplan&Norton 1996b).

Fourthly, customer profitability is measured, as a satisfied customer is not enough but it should also be profitable to do business with a certain customer. Activity-based cost systems are often used to measure individual and aggregate customer profitability. In order to fulfill customer demand profitably, a company might have to redesign key processes that deliver the service or product to the customer, seek price increases to compensate for the resources that must be deployed to satisfy customer's demand, or even decline a customer request (Kaplan and Norton 1996c).

The final measures relate to market and account share measuring the rate a company is penetrating a desired market. The market share reflects the proportion of business in a given market in terms of number of customers, money spent, or unit volume sold (Kaplan&Norton 1996c). The share of the "customers' wallet" (the account share) can also be measured (Kaplan&Norton 1996b).

Internal business process perspective

The measures of internal business process focus on those processes that have the greatest impact on customer satisfaction and achieving the financial objectives (Kaplan&Norton 1996b). A generic value-chain model has three principal business processes that are innovation, operations, and post-sale service as presented in Figure 2-7 (Kaplan&Norton 1996c).

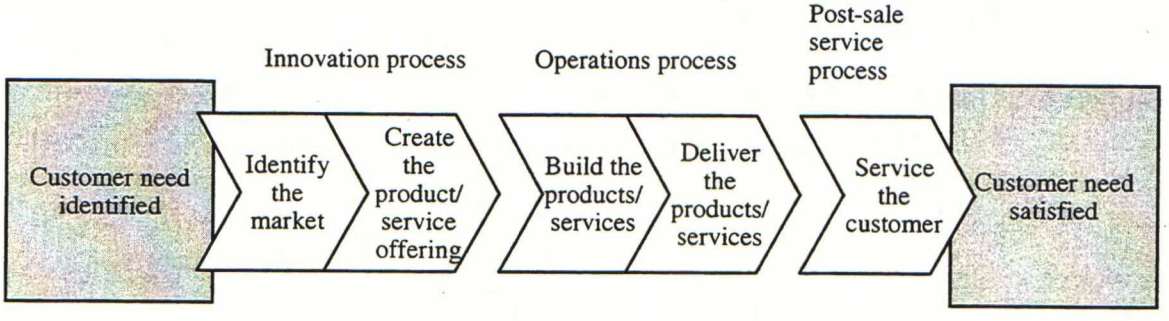

Figure 2-7: The internal business process perspective – The generic value-chain model (Kaplan&Norton 1996c)

The aim of the innovation process is to research the emerging or latent needs of customers and create products or services that meet these needs (Kaplan&Norton 1996c). In the first phase of the innovation process, market research is done to identify the size of the market, customers' preferences as well as price points for the targeted product or service. During the phase of creating the product or service offering, for example, research is made to develop new products and services and to exploit existing technology for the next generation of products and services (Kaplan&Norton 1996c). Measures of the innovation process could include, for example, percentage of sales from new products and time to develop next generation of products. Measures for new product development could be number of modifications needed or "first-time-right" percentage (the designed product or service meets customer specifications from the beginning) (Kaplan&Norton 1996c).

The operations process on the other hand represents the short wave of value creation in organizations (the supply process in Weele's framework). The process starts with receipt of a customer order and ends with delivery of the product or service to the customer. Efficient and timely deliveries of products and services to customers are stressed. Traditional measures for the operations process are financial, such as standard costs, budgets, and variances. Nowadays, measures like time, quality, cost performance, and sometimes flexibility are also used to evaluate the operations process. Lead-time, for example, measures the time between customer order and delivery of a product or service to the customer. Process quality measurements include, for example, yield, waste, scrap, rework, returns, and percentage or processes under statistical process control (Kaplan&Norton 1996c). Service organizations, especially, aim to identify the defects in their internal processes that could unfavorably affect costs, responsiveness, or customer satisfaction. Activity-based cost systems provide an applicable means to analyze the process cost performance. To simplify, activity-based costing is used to analyze functions (processes) and their resource consumption. Accordingly, the costs are divided to those processes and further on to output units (Vehmanen&Koskinen 1998).

Post-sale service is the last phase in the internal value chain. It includes warranty and repair activities, treatment of defects, and returns and processing of payments. Companies can measure their post-sale service process by applying time, quality, and cost metrics similar to the operations process. Thus, cycle times (from customer request to resolution of the problem) can measure the time of response to failures; cost metrics can evaluate the efficiency (the cost of resources used); quality metrics can measure first-pass yield reflecting the percentage of

customer requests resolved with a single service call rather than requiring multiple calls (Kaplan&Norton 1996c).

Learning and growth perspective

Learning and growth is the fourth perspective of the BSC. In order to succeed in competition and to be able to bring value to customers and other stakeholders, companies need to improve their capabilities all the time. The financial, customer, and internal business process objectives on the BSC will typically reveal gaps between the existing and required capabilities of people, systems, and procedures (Kaplan&Norton 1996b). In order to close the gaps, investments in the three sources of learning and growth are needed. Kaplan and Norton (1996c) categorize the sources as:

- Employee capabilities,
- Information systems capabilities, and
- Motivation, empowerment and organizational alignment.

Figure 2-8 describes the measurement framework.

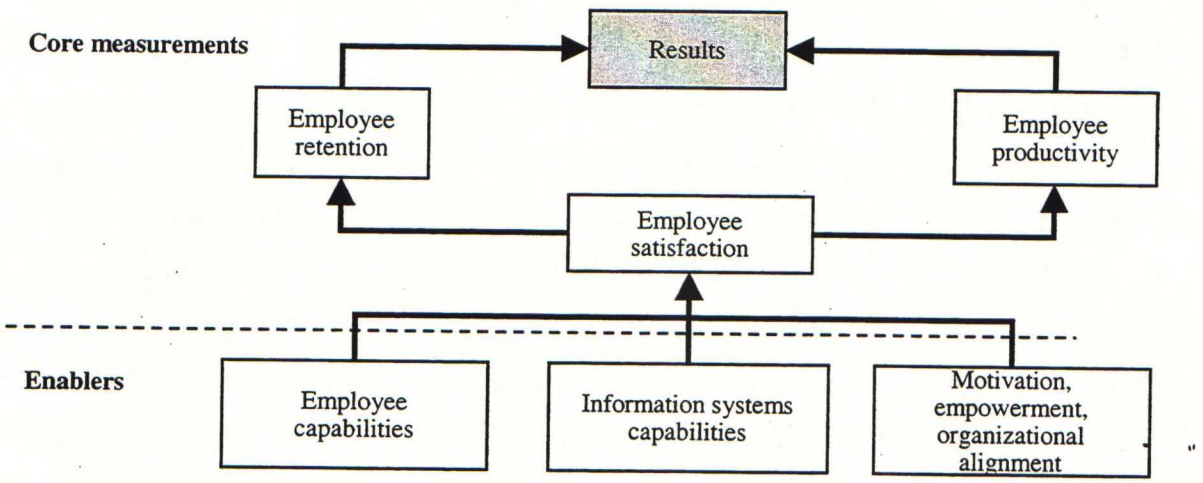

Figure 2-8: The learning and growth measurement framework (Kaplan&Norton 1996c, modified)

Satisfied employees are a precondition for increasing productivity, responsiveness, quality, and customer service. Employee satisfaction is usually measured periodically using a satisfaction survey and asking questions related to, for example, involvement with decisions, recognition for doing a good job, access to information, and overall satisfaction with company (Kaplan&Norton 1996c). Employee retention is generally measured with a percentage of key staff turnover (Kaplan&Norton 1996c). Employee productivity combines the aggregate impact of enhancing employee skills, innovation, improving internal processes, and satisfying customers. Productivity is typically measured with revenue per employee (there are risks involved with the measure as

companies can outsource functions or reduce the number of employees whereupon the revenue per employee might seem to improve but simultaneously, the company's long-term capabilities could get lowered; this tendency is supportable when the strategic intent is to increase the level of outsourcing).

Information systems support employees in their decision-making, as excellent information on customers, on internal processes, and on financial consequences is required. For example, front-line employees need information accurately and timely about each customer's total relationship with the company (Kaplan&Norton 1996c). Customer relationship management (CRM) tools can help in active maintenance and management of the customer relationship (Emerging Market Technologies 2001). The front-line employees need information also about the customer segments in order to make decisions on how much effort should be expended with each customer (Kaplan&Norton 1996c). Additionally, employees in the operations side of business need immediate feedback on the product or service delivered to the customer.

The final source of learning and growth is motivation, empowerment, and organizational alignment. Even though employee capabilities were sufficient and information systems were available, it is not possible to achieve excellent results without high employee motivation and initiative. Employees need to be motivated to act in the best interest of the organization. Measures, such as suggestions per employee and the time it takes to implement process improvements, indicate employees are actively participating in organizational improvement activities. They are also indicators of organizational and individual alignment. In addition to measuring employees individually, one could measure the team performance especially when teams are essential in carrying out the processes. In this case, the measures could be, for example, the degree to which the organization is entering team-based relationships with other business units or customers and the number of teams where team members share common objectives and incentives (Kaplan&Norton 1996c).

3. An evaluation model for sourcing processes

In this chapter, an evaluation model for assessing the effectiveness of the sourcing process is constructed based on the elements presented in Chapter 2. The intent is not to cover all details of the sourcing process but to concentrate on the most critical subjects in order to evaluate the effectiveness of the process. Using findings in the literature as well as discussions with professional sourcing managers, the most critical phases have been identified. The model has been complemented with factors found important in practical sourcing.

3.1 Structure of the evaluation model

The evaluation model is organized around the sourcing process. Thus, there are three sections in the questionnaire used in evaluation (see Appendix 2). The first section covers the sub-process of determining specifications. The second section relates to supplier selection, and the third section discusses the sub-process of agreement negotiation.

Based on the identified critical phases, metrics to evaluate the particular phase are generated. In the evaluation model, there are six arguments per sourcing sub-process. The questionnaire that will be used in the empirical part is available in Appendix 2. Most of the questions are subjective in nature and are to be answered on the following scale: Strongly agree – Agree – Neutral – Disagree – Strongly disagree (score 5 to 1 is given respectively). A numeric value is required to answer some of the questions. In such a case, the same scale (5–1) is used. When using the evaluation model, it is important that the person (or persons) evaluating the sourcing process is able to analyze the situation objectively and thus, the answers given reflect the reality.

In accordance with the BSC methodology, measures are selected from several perspectives. This methodology is applicable to sourcing as statistics indicate even 40–50 percent of cost reductions due to strategic sourcing initiatives come from non-price improvement opportunities (Litton 2001). According to Weele (1994), the sourcing organization can contribute indirectly to corporate performance, for example, by product standardization that brings various advantages. First, product standardization reduces the product and service variety and as result, the company buys specific standard products and services (instead of supplier-specific) from standard suppliers. This may lead to less dependence on certain suppliers and lower number of items to be kept in stock. Second, standardization is likely to reduce number of individual purchase items as well as maverick buying (Hough&Ashley 1992). Third, standardization of products is one means

for more effective purchasing of operating resources. For example, for a single employee in need of a personal computer, a pre-defined product variety in a catalog makes the product selection easier and more efficient. Finally, standardization of product and service offering is a way in which sourcing can enhance asset utilization. By providing generic product and service solutions, different business units are able to utilize each other's assets and share common resources whenever applicable. This in turn is likely to reduce the volume bought and transactions made in general as well as reduce the amount of waste contributing to the total cost of ownership as well.

In the following paragraphs, the critical phases are discussed and argued. For argumentation purposes, there are a number of literature references. Based on the critical phases, arguments (questions) to evaluate the phase in question are formulated as presented in Appendix 2.

3.1.1 Section 1: Determining specifications

Six critical success factors were identified in the determining specifications phase. From the viewpoint of the sourcing organization, these include receiving a clearly specified sourcing request from the customer, aligning various customer requirements, identifying the most potential suppliers, identifying new product and service solutions on the market, gaining additional value from the new product and/or service concept in comparison with the current operating mode, and supporting enhancements in the operative purchasing process. The measures generated relate to these themes.

The first subject supporting effective sourcing is a clearly defined, analyzed, and documented business need together with a sourcing request. Without a justified business need the sourcing process should not begin and thus, the documentation provided by the customer is of major importance. It is essential the initial order is in a standard form, as it will be referred to later on. The sourcing organization has to be able to analyze the business need objectively in order to make a decision on the consequential activities, i.e., will it be worthwhile to start the process or are similar products or services already purchased elsewhere in the organization. A related decision is made also whether a global or a local supplier is looked for.

The second theme involves the specifications. In short, the sourcing process can be evaluated on the basis of its capability to align needs and specifications of different business units within the company. As discussed earlier, there are four types of specifications: functional, detailed technical, logistics, and maintenance specifications. Additionally, the commercial specifications are to be determined. The sourcing organization defines these in cooperation with the customer

who originally made the request for sourcing. Additionally, sourcing collects the needs of various business units and the specifications are determined accordingly. In order to reach economies of scale through negotiation power, the individual goals and needs of various customers have to be aligned (Hough&Ashley 1992). This is in line with Baily et al. (1994), who state one of the sourcing objectives to maintain of sound co-operative relationships with other departments, providing information and advice as necessary to ensure the effective operation of the organization as a whole. As a result, an extensive agreement allows all business units of a company to utilize the negotiated agreement. It is noteworthy that the scale and depth of the specifications may vary depending on the situation and the agreement scope. For example, a frame agreement may contain only generic specifications, and the business units define the details as they make the actual order (a so-called case agreement).

Thirdly, the success and effectiveness of the sourcing process can be evaluated on the basis of its success to identify the most potential suppliers from the market or from the existing supplier base. In an effective supplier scanning phase, the best suppliers are considered for further analysis. This requires the specifications are to be determined in a way they do not rule out potential suppliers without justification. For example, in some cases, the customer might have a strong opinion of the "right" supplier who should be selected. Yet, the sourcing process cannot be effective if all potential suppliers are not evaluated. On the contrary, all suppliers should be given the same opportunity to participate the bidding process and thus, there are real choices to choose from. In order to investigate and evaluate the potential suppliers available, a request for information (RFI) is typically sent to number of suppliers. The RFI has several functions, for example, to receive information on suppliers and to analyze them but also to gain information on the market supply. The latter is discussed further later in this paragraph.

The fourth theme is the new solutions (products, technologies, and services) available on the market and identified during the sourcing process. This theme relates also closely to the preceding theme as new solutions can be scanned in the RFI process if all potential suppliers are approached and given an opportunity to bid. Access to new resources and innovations are one of the top priorities of supplier relationships (Slaight 1999). Sourcing function should provide the best products and services to the customers and for this purpose, it should continuously identify the market and create new product and service offering. Industrial innovations often follow from an intensive interaction between suppliers and buyers and from monitoring supply market trends (Baily et al. 1994; Weele 1994). In case of operating resources, new innovations could mean new products, upgrades, design, services, user friendliness, or other major improvements as discussed

earlier. Thus, one of the aims of the sourcing process is to identify innovative technological solutions and service packages in addition to standard solutions. The process should encourage suppliers to introduce new innovations and improvements (and substitutive products). In respect to the BSC, a sourcing organization should excel in the internal processes that aim at having a set of suppliers who can fulfill the product and service requirements in terms of performance, functional, contractual, and financial capability as well as volume capability.

The fifth theme is the added value the organization can expect. The specified products and services should add value in comparison with the current portfolio and not overlap with it. Added value may be gained through a new service concept such as vendor managed inventory where supplier holds inventory for the buyer and makes sure the inventory level is kept at optimum and up to certain minimal levels without individual orders from the customer (Fleischer et al. 1999). Vendor managed inventory is likely to improve the service level but also asset utilization and cash-to-cash cycle. Other means to gain additional value include, for example, new technological solutions, changes in the total cost of ownership, improved processes, training, asset management, and other services (e.g., Purchasing June 2000). Fleischer et al. (1999) state integrated packages together with greater volume from a single supplier can result in fewer purchase orders, lower prices, better delivery performance, and all in all better supplier responsiveness to customer needs. According to a manager in Nokia, instead of buying individual products or services, in the future companies will concentrate more on buying complete concepts and solutions. Also Haapanen and Vepsäläinen (1999) support the idea as they present the stages of development of distribution. In the stage of service-oriented distribution companies begin to utilize outsourcing services in order to separate the supporting functions from the core business. To measure the sourcing process from the perspective of added value, the savings potential is to be evaluated. The additional value can be measured and verified in terms of money and/or interpreted in savings potential percentage.

Finally, enhancements in the operative purchasing process are incorporated in the sourcing process measurement. As mentioned earlier, developing purchase, ordering and invoicing routines are among key actions when non-critical operating resources are in question. Means to improve operative purchasing activities include, for example, standardization of the product and service assortment, reduction of the number of suppliers, availability of electronic purchase catalogues, automated ordering and invoicing, and use of purchase cards. Standardized purchasing processes support cost efficiency and productivity by reducing costs per a purchase transaction. Thus, the sourcing process can be evaluated on the basis of improvements for the

operative purchasing activities. The aim is to evaluate the improvements in terms of savings potential percentage.

3.1.2 Section 2: Supplier selection

The supplier selection process aims at identifying the most potential suppliers and evaluating them on pre-defined criteria. In the following, the critical themes related to supplier selection are discussed. The themes involve supplier evaluation and selection criteria, quality of the request for purchase (RFP), analysis of the quotations, support to company's strategies, pricing model analysis, and cooperation with the customers.

First of all, in order the sourcing process to be effective, the supplier evaluation criteria have to be defined carefully. The selected criteria need to be such that eliminate suppliers during the process efficiently. Suppliers that are considered to have the ability to handle the expected demand in terms of, for example, locations, technology, labor, and financial condition, are taken into further analysis (Scheuing 1989). Thus, the workload can be minimized as there is no need to, for example, evaluate all suppliers on the total cost of ownership (TCO) basis but instead, only few suppliers proceed in the process to the TCO analysis phase. An example could be given to highlight the idea: information is requested (RFI) from a number of suppliers in order to scan the market and find innovative product and service concepts. Based on information analysis, some suppliers are eliminated from further analysis. A request for purchase is later on sent to, for example, maximum of 50 percent of the suppliers from whom information was originally requested. The next phase is to evaluate the quotations and again, an in-depth analysis is performed for, for example, maximum of 50 percent of the received quotations. Thus, the pre-evaluation of the quotations is made with such criteria that make it unnecessary to compare all quotations on the most detailed level possible. The aim is to minimize the workload and to maximize the benefits. Thus, the criteria further and support objective supplier selection.

The second theme relates to the RFP process where suppliers are requested to provide detailed information against buyer's specifications. The quality of the RFP preparation can be a measure for the sourcing process as the RFP preparation is of high importance. In order to receive quotations from all bidders in a similar, comparable format, the questions in the RFP need to be unambiguous. If the RFP is well structured, the quotations are likely to be, too.

The third critical success factor is the sourcing organization's capability to analyze the most promising quotations. Preferably the analysis would base on the TCO model. As discussed in

Sub-chapter 2.2, the TCO approach considers the life-cycle costs of a purchase instead of concentrating purely on, for example, unit price.

The fourth key success factor of sourcing is its contribution to company's overall strategy and support to the sourcing strategy. Generally, all decisions and actions taken during the sourcing process need to be in line with the strategies. One of the strategy related questions include the method of contracting out that can also be understood as the scope of outsourcing: Which activities are to be acquired in-house and which activities are bought from external parties? What are the scope and scale of the outsourced activities? Another strategic question is the actual supplier selection. For example, if the strategic intent is to reduce number of suppliers, the supplier is selected among the existing suppliers with whom the company already has business (assuming the supplier is capable of delivering according to specifications). Often in order to support the sourcing strategy, the selected supplier should complement the existing suppliers in terms of, for example, product portfolio and technological capabilities. Thus, the buying company benefits from a strengthened supplier network. Finally, the agreement type should be in line with the products and services in questions. For example, certain small value items are typically bought as a service package including delivery of the items together with an agreed service (such as vendor managed inventory). Various agreement types exist, and the process aims at finding the best possible agreement type for the purpose. Some agreement types used in operating resources were introduced earlier. In the evaluation model, the agreement type is incorporated into supplier selection section (as a strategic theme) and not into agreement negotiation section. This is due to practical reasons as often the decision on the agreement type is made prior to agreement negotiation phase.

Fifthly, during an effective sourcing process the pricing model and pricing structure offered by the supplier is carefully analyzed. In addition to the TCO analysis, the buyer should be able to analyze and understand supplier's cost structure. Thus, it is possible to understand the pricing logic and to evaluate potential for process improvements and consequent price reductions. According to an article in Purchasing Magazine Online (June 2001), a long-lasting and sustaining component of cost savings in operating resources is to truly understand supplier costs. It may be possible to make a price breakdown calculation based on supplier's data. The risks related to pricing vary depending on the pricing model but in any case, the buyer need to understand the risks involved. For example, in case of cost-reimbursable pricing the final price is not exactly even though a price ceiling might be set (Heinritz et al. 1991).

Finally, from the viewpoint of effective sourcing, the supplier is eventually selected according to criteria that were defined in cooperation with the customers. But additionally, the criteria have been mutually weighted and used to select the supplier with whom further negotiations are started. The customers need to understand the selection criteria and priorities in order for common understanding. As quoted earlier, the ranking method moves the user and the sourcing organization towards a joint decision (Weele 1994). Furthermore, it seems reasonable to assume that common understanding and ability to participate improves employee satisfaction.

3.1.3 Section 3: Agreement negotiation

Agreement negotiation sub-process aims at reaching an agreement with the most capable supplier to provide products and services according to specifications. Even though agreements vary by scope, for example, a frame agreement may differ from a so-called case agreement on the basis of focus and details, a basic assumption is the differences do not prevent using the same sourcing process as a baseline.

There are six areas that were identified critical from the viewpoint of effective sourcing: use of company's generic agreement template with terms and conditions, managing risks of the operative purchasing, defining arrangements for the operative purchasing, considering implementation related activities, managing risk related to changes in the operational environment, and finally sharing a common understanding of the future activities and business. These issues are discussed in the following.

The first theme is the use of company's generic agreement template with terms and conditions. As discussed earlier, standardized terms and conditions lessen the possibility of misunderstanding, undue compensation, the likelihood of change orders, and the occurrence of claims of litigation arising. Thus, standardized conditions lessen the risk involved in agreement making. Terms and conditions may include factors such as terms of payment, terms of delivery, conditions for intellectual property rights, warranty terms, terms of termination and cancellation of an agreement, terms for altering an agreement, and consequences for breach of an agreement. Most of these exist in order to manage risk related to non-compliances during the agreement validity. Additionally, a relationship between effective sourcing process, especially the terms and conditions, and employee satisfaction seem to exist. For example, when the terms and conditions are clear there is no room for misunderstanding or complaints. Thus, the employee responsible for a certain purchase, can rely on the conditions and there is no need to re-negotiate them.

Typically, the company has specified generic terms and conditions that are used throughout the company whenever applicable and accepted by the supplier.

Second, issues related to the operative purchasing are to be considered and determined. The more an agreement determines clauses for practical purchasing, the easier it will be for the buyer to begin operative activities. The clauses referred to include, for example, batch sizes, ordering and invoicing practices, and other means to guarantee successful order-delivery process. Some of these clauses may be covered in the generic terms and conditions, too. A link between a comprehensive agreement and improved employee (buyer) productivity can be seen as purchasing operations can be simplified if the agreement includes certain clauses, terms, and conditions (Hough&Ashley 1992).

Third, risk management against the operative phase is to be considered when the sourcing process is evaluated. Operational risks tend to appear only after some time of operating with the selected supplier but these risks are to be analyzed already during the sourcing process. Possible operational risks include, for example, deviation in quality and delivery times, supplier's capability to serve and solve problems, and non-compliance with agreed terms and conditions. There could be problems also in the area of security, ownership of intellectual property rights, and pricing. Once potential risks have been surveyed, baselines, measures, and consequences in case of deviations are to be specified. For example, the agreement can define how delivery performance and quality are monitored, and what are the actions in case of deviations. The consequences may include price discounts, interests for delays, or even termination of the agreement. The consequences are proportioned with the related risk.

Fourth, implementation related activities are to be considered during the sourcing process. Implementation refers to starting to use the products and services specified in the agreement. Issues to be considered include, for example, how the new agreement is communicated to customers (business units) and individual users. Another issue to be considered is ensuring customers' commitment to use the agreement and the approved supplier. Also corrective actions are to be thought in case the new agreement is not implemented as planned. Sourcing can only be effective when its contribution, the agreement, is taken into use throughout the company.

Fifth, the sourcing process should prepare for future changes in the environment or market situation. These can be hard to predict at the time of negotiations but however, the agreement should provide flexibility in case of sudden changes in a way the buying company does not experience losses. For this purpose, control points and other means are to be negotiated. For

example, in order to hedge against unexpected price changes, prices can be index-linked or they can be linked to a defined statistic (Sakki 1982).

The final concern in the sourcing process is the scope of the relationship with the supplier. One of the objectives of sourcing is to negotiate effectively in order to work with a supplier who will seek mutual benefit through economically superior performance (Baily et al. 1994; Scheuing 1989). The process can be said to be effective if it supports the desired depth and permanence of the supplier relationship. The customer, the sourcing organization, and the supplier need to share a common understanding of the future needs and views. An assumption can be made that in case an agreement is reached via a full-scale sourcing process, the aim is to have a long-term relationship with the selected supplier. A complete sourcing process requires such an amount of resources it might not be worthwhile in case of one-time purchase. Instead, a simpler approach is often preferred. As part of supplier selection, it should be possible to evaluate supplier's long-term capabilities and risks that tend to be different depending on the intended length of the relationship. In the case of one-time-purchase, the risks are lower than in the case of strategically important purchase that the buying company intends to use for years. Additionally, future needs, business potential, and capabilities are to be aligned between the supplier and buyer including the needs of the internal customer. Avery (2001) mentions that building relationships with a few key suppliers is worthwhile. The best practitioners in operating resources purchasing commonly state that close relationships with key suppliers bring benefits such as long-term cost savings when the partnership is so strong suppliers feel comfortable working on pricing, service, technology and other areas of business. A supplier has to understand buyer's needs but on the other hand, the buyer has to understand supplier's business drivers and practices. It is said that collaborative process development activities can help both parties to cut costs in their processes resulting a stronger competitive position.

3.2 Summary of the evaluation model

The sourcing process evaluation model is summarized in this sub-chapter. The intent of the model is to evaluate the sourcing process from several perspectives. Thus, the methodology in the background is the balanced scorecard. The evaluation model is divided into three sections that follow the sub-processes of sourcing: determining specifications, supplier selection, and agreement negotiation. There are six arguments per sub-process to balance their equal importance. In Table 3-1 the generic subjects of the model are summarized. Based on the

identified critical phases in the sourcing process, detailed arguments to evaluate the process are formulated. The complete evaluation sheet is found in Appendix 2.

Table 3-1: Subjects of the sourcing process evaluation model

Sourcing sub-process	Subjects of the evaluation model
Determining specifications	Business need documented
	Specifications aligned with different customer groups
	The most potential suppliers identified on the market
	New solutions (products, services) identified from the market
	Improvement potential in comparison with current solutions analyzed
	Efficient operative purchasing supported
Supplier selection	Efficient supplier selection criteria used
	RFP well-structured to support objective supplier selection
	TCO analysis completed
	Strategies of the company supported
	Pricing model analyzed
	Supplier selection criteria weighted in cooperation with customer(s)
Agreement negotiation	Company's agreement template with terms and conditions used
	Operative purchasing activities and procedures defined
	Risks and deviations during operative purchasing considered
	Implementation related activities considered
	Flexibility in case of changes in, e.g., market situation considered
	Future requirements understood and aligned between the parties

The subjects of the model reflect the BSC methodology. For example, the subject "Pricing model analyzed and communicated" indicates the financial perspective; respectively "new solutions identified from the market" indicates internal business process perspective and so on.

In the practical usage of the evaluation model, it is important that the person (or persons) evaluating the sourcing process is able to analyze the situation objectively and thus, the answers given reflect the reality. This may be difficult as most of the arguments are subjective in nature.

Thus, the person responsible for the activities could fill it in together with his/her superior or a group could fill in the questionnaire to guarantee objectivity.

The model can be used for several purposes. First of all, it can be used to evaluate a particular sourcing case afterwards. Second, the model can be used to analyze and develop the sourcing process generally. For example, if various cases show values given on a certain area are low, a need for process development or training can be identified. Third, the person responsible for the sourcing process can use the model for self-evaluation. The person's superior may also use it to evaluate the performance of the subordinate. Fourth, the information collected in the questionnaire may be used to communicate the business benefits and added value achieved at the end of the sourcing process. Finally, the model can be used to set targets for the sourcing organization and for individual sourcing cases. For example, more emphasis can be put on a certain area, such as, finding innovative solutions. Innovative solutions are likely to be found if the RFI process is given a high order of importance. Thus, the model can be used for planning purposes in advance and for reviewing the effectiveness of a particular case or several cases afterwards.

The model intents to evaluate the sourcing process for operating resources (noncritical items in the purchase portfolio presented in Paragraph 2.1). Thus, issues that are to be considered for other three types of items have not been emphasized. Such issues would have been, for example, long-term purchasing agreements and make-or-buy expositions in case of strategic items; safety stocking and guaranteeing availability even on the cost of price in case of bottleneck items; and defining the relation between agreement and spot-purchases together with target pricing in case of volume items (Koskinen et al. 1995).

4. Case study: Nokia Operating Resource Sourcing (ORS)

The aim of Chapter 4 is to apply the sourcing process evaluation model in the case company. First, the case company and the organizational unit where the empirical study is performed are introduced. Next, the sourcing process, as applied in the company, is described. Finally, the cases analyzed are presented.

4.1 Introduction to the case company

Nokia is the world leader in mobile communications. There are currently approximately 54 000 employees with sales to over 130 countries. Nokia has two business groups, namely Nokia Networks (NET) and Nokia Mobile Phones (NMP), and the company also includes a separate Nokia Ventures Organization (NVO) and the corporate research unit Nokia Research Center (NRC). There is research and development in 15 countries. NMP is the largest business group with approximately 76 percent of Nokia's net sales. NET represents approximately 22 percent and NVO approximately 2 percent (Nokia web pages).

In 2001, the net sales of Nokia were EUR 31 191 million with a growth of 3 per cent (growth a year earlier was even 54 percent). Pro forma operating profit was EUR 5 237 million with operating margin of 16,8 percent. Pro forma net profit was EUR 3 789 million. According to Nokia Chairman and CEO, Jorma Ollila, year 2001 was characterized by intense competition, extreme volatility, and a weakened global economy (Nokia Annual Results 2001). This could be seen also in the annual results of Nokia's main competitors. The key figures of Nokia are summarized in Table 4-1.

Table 4-1: Key figures of Nokia (Pro forma; EUR Million)

	2001	**2000**	**Change (%)**
Net sales	31 191	30 376	+3
Operating profit	5 237	5 861	-11
Financial income and expenses	125	201	+23
Net profit	3 789	4 027	-6
Earnings per share, basic (eur)	0.81	0.86	-6
Earnings per share, diluted (eur)	0.79	0.84	-6

The empirical part of the study is made for Nokia Operating Resource Sourcing (ORS). Nokia ORS is responsible for the strategic sourcing and purchasing of Nokia's operating resources

including development of processes and tools that support these activities. Until some time ago, all business groups of Nokia have had their own sourcing and purchasing organizations and sometimes even individual business units with the business groups have had their own operations. The target of Nokia ORS is to consolidate Nokia-wide purchasing volumes and ensure more efficient use of resources (Nokia intranet).

Nokia ORS consists of six service lines that give sourcing services to Nokia's business units and platforms. The responsibilities cover definition of the service offerings jointly with business owners, managing the supplier base, contracting with global, regional and other suppliers, and implementing ORS strategy and processes within each service line. Each service line is responsible for sourcing certain products and services. Examples of them are presented below in Table 4-2.

Table 4-2: Examples of products and services of Nokia ORS service lines

Service line	**Products and services (examples)**
Information and Communication Technology Services	Servers and workstations Office hardware and terminals Office software Operator services
Travel Management	Air, train, and bus travel Hotels Travel agencies Credit cards
Infrastructure Services	Facility services Office furniture Office supplies Canteen services Health services
Software and External Resource Services	Software tools in Research and Development Consultancy Training and other learning solutions
Manufacturing and Test & Measuring Equipment Services	T&M equipment, software and systems Manufacturing equipment Service and spare parts
Marketing and Communications Services	Advertising Fairs Brochures

In addition to global sourcing services, Nokia ORS provides also local purchasing services. The consolidated purchasing organizations consist of professional buyers.

4.2 The sourcing process in ORS

In this sub-chapter, the sourcing process of Nokia ORS is described briefly. In Nokia ORS, an agreement is a result of supplier approval process that has three sub-processes: supplier scanning and evaluation; supplier verification; and agreement making. The most important input to the sourcing process is an evaluated and justified business need, as the process shall not continue without a relevant business need. The process is basically the same as in the framework of Weele (1994) presented in Sub-chapter 2.2 even though the terminology in use varies to some degree.

The supplier approval process of Nokia ORS is summarized in Figure 4-1. The main process inputs are justified business need and a case study, customer specific requirements, technical and commercial data, and demand & supply plan. These can be said to equal to the end result of determining specifications sub-process as in Weele's (1994) model. In case of Nokia ORS, the specifications are not integrated in the sourcing process but they are the key inputs to the process. The sourcing organization participates the determination of the specifications.

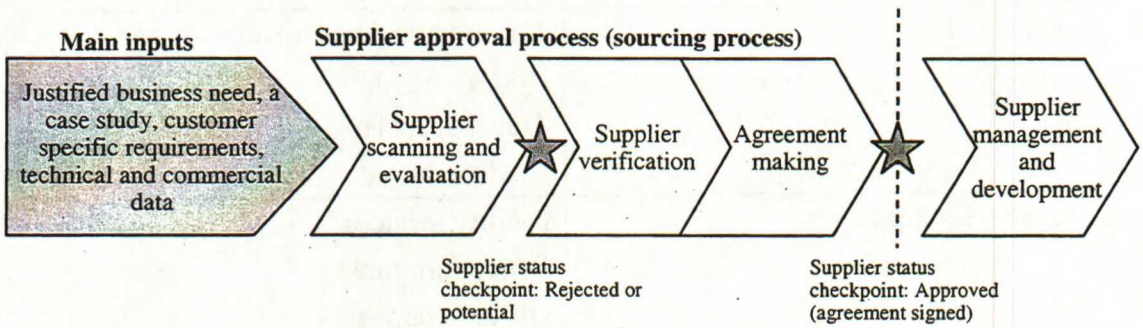

Figure 4-1: Supplier approval process of Nokia ORS

Once the business need has been carefully verified and analyzed, the supplier scanning and evaluation phase may begin. In this stage, the existing supplier base is scanned in order to identify suppliers for the business need in question. Additionally, the market supply may be investigated if none of the existing suppliers is capable to fulfill the requirements. Suppliers are evaluated against selection criteria in terms of, for example, technical and commercial capabilities. During supplier scanning and evaluation, new services and products available on the market can be identified. The phase ends with a checkpoint where individual suppliers are categorized either potential or they are rejected.

In case a supplier or suppliers are found potential, they move on in the supplier approval process to a phase called supplier verification. The purpose of the supplier verification is to identify supplier's performance and financial status to define its capability to become an active supplier. Supplier's capabilities are verified against selected criteria (in the previous stage suppliers typically make a self-evaluation and the contents are verified in this stage), and a risk analysis is made. The main output of the process is a common understanding of business goals and requirements together with supplier evaluation report including a corrective action plan. The process aims at a having a supplier capable of performing according to expectations.

Agreement making is the last phase of the supplier approval process. The purpose is to reach an agreement, i.e., to define common rules for potential business relationship with the most capable supplier. The whole process aims at limiting the number of suppliers in such way that negotiations start with a very limited number of suppliers. The agreement making phase is similar to agreement negotiation in the framework presented in Sub-chapter 2.2. Agreement making means practically that requests for purchases are sent and received quotations are analyzed against pre-defined criteria. There may be several rounds of negotiation before the agreement is finalized and signed.

Supplier management and development process follow the supplier approval process. It intents to create and continuously maintain a competitive set of suppliers for supplying requested services and competencies. Means include, for example, measuring supplier's performance against agreed. Additionally, in the supplier management and development process Nokia works in cooperation with selected suppliers in order to develop the relationship and gain mutual benefit.

The basis is that each agreement negotiated goes through the same sourcing process. For practical reasons, the process is occasionally not followed perfectly but in such cases, the decisions have to be appropriate and rationalized.

4.3 Implementation of the case study

The case study was implemented via interviews that proceeded in accordance with the questionnaire presented in Appendix 2. This approach was chosen, as the intent was to guarantee the questionnaires for each sourcing case were filled in according to the same principles and to collect feedback on the evaluation model. Altogether five sourcing cases were analyzed in cooperation with the manager responsible for each case. The interviews were held in February

2002. On average, an interview lasted for two hours during which the questionnaire was filled in and other relevant information related to the case was collected.

In order to test the sourcing process evaluation model, the cases were selected carefully to ascertain they would present the area of operating resources widely. The sourcing cases presented in Table 4-3 were selected.

Table 4-3: Cases in the analysis

Nokia ORS service line	Case
Manufacturing and Test and Measuring Equipment Services	A: Material handling and packaging technology
Infrastructure Services	B: Electricity purchasing (outsourcing)
Travel Management	C: Travel agency services
Engineering Software Tools and External Resource Services	D: Learning solutions services
Information and Communication Technology Services	E: Hardware recycling services and products

In the case company, consolidated operating resource sourcing is a fairly new concept and thus, there were limitations in the number of sourcing cases that were suitable for the analysis. For example, in the Marketing and Communications area several sourcing processes are ongoing but the results (agreements) are not yet available. Thus, no cases from that area could be selected for the empirical study. On the other hand, in the Information and Communication Technology area most agreements have been effective for a longer period of time and thus, the most recent sourcing cases do not deal with "traditional" sourcing (such as, sourcing of laptops). It is notable that most cases combine products with services that are ever-increasing in operating resource sourcing and purchasing. Most of the selected cases can be placed on the non-critical area in the purchase portfolio matrix even though it could be argued thereof. For example, Koskinen et al. (1995) note many items can be considered occasionally to be bottleneck items for various reasons.

4.4 Case analyses

The purpose of this sub-chapter is to describe the cases to the extent that is required in order to understand the concept in question. The most successful phases and on the other hand the phases with most improvement potential in the sourcing process are presented in order to argue the effectiveness of the particular case. Even though the total score for each sourcing case is given, the intention is not to compare the sourcing processes between each other. Instead, the intention

is to test whether the generic evaluation model can be used for the wide area of operating resources. The intent of each sourcing case was to reach a company-wide agreement with a supplier(s) in order to offer similar product and/or service portfolio for all business units and users within the company. In the following, each case is presented briefly. The sourcing cases are summarized in Appendix 3.

Case A: Material handling and packaging technology

The starting point in Case A was market requirements to change packaging type of certain end products. Thus, the requirement originated from external customer needs and was completed when a new type of packaging technology was taken into use in manufacturing. At the time the need emerged, none of the existing suppliers was able to provide such technology and thus, a thorough market scanning was needed in order to find a suitable supplier. Eventually, as a result of product development, an existing supplier was selected. This supplier operates globally and provides Nokia several types of technological solutions. A frame agreement exists with the supplier and the thus, it was possible to utilize the earlier negotiated terms and conditions. The agreement negotiated is a so-called a case agreement order that relies on the frame agreement.

The technology is question is an integral part of a production line as end products are first packed separately and then combined to larger entities for delivery. In accordance with the definition of the case company (also Barry et al. 1996), sourcing of the packing materials is not in the scope of operating resources but the technology (machines) that actually pack the products, belong to the scope of operating resources. In the purchase portfolio, the material handing and packaging technology discussed can be positioned in the strategic area mainly because it is an essential part of the end product. It can be replaced but replacing would take a long time due to rareness of the technology.

The sourcing case of material handling and packaging technology was evaluated to be worth 80 points with an average of 4,44. In the following, the most successful phases of the sourcing process are first presented. Then the phases with most improvement potential are discussed.

The input for the sourcing function was clear: new technology was needed to fulfill external customer requirements. The specifications were clearly specified, as the customer requirements were explicit. Additionally, alignment of requirements of various business units was done successfully. In this case, the sourcing function was involved from the beginning enhancing a through market scanning. Market scanning was essential as none of the existing suppliers could provide the required technology. In the early phases of the sourcing process, more than fifteen

suppliers were identified to have potential to provide the technology. Thus, the most potential suppliers were considered and given an equal opportunity to participate the process. During the specifications phase, new solutions were identified from the market, and even though those solutions could not be utilized in this case, they were collected for future reference. The RFI sent to potential suppliers described the need on a generic level allowing the suppliers to offer innovative solutions.

The process was successful when support to strategies and pricing model are analyzed. In this case, it was possible to make a thorough price analysis allowing the buyer to make a fact-based decision related to pricing. In the agreement, company's generic terms and conditions were used (as mentioned, a frame agreement with the supplier existed and thus, the terms and conditions had been negotiated earlier). The earlier negotiated frame agreement defined also procedures in case of deviations from agreed. Types of potential deviations were specified in the case agreement.

In case A, implementation related activities were managed exemplarily. Functional end customer requirements were first translated into technological requirements that were then passed on to supplier strategy. The supplier strategy is generated in cooperation with the sourcing and internal customers. Thus, when the supplier and agreement type selected are in line with the supplier strategy, it can be justifiably expected the internal customers are committed to execution of the agreement. Finally, Case A succeeded in reaching an agreement that supports the desired depth and permanence of the supplier relationship. This is furthered by the existing frame agreement, too.

The process was not similarly successful when calculation of improvement potential in question. The new technology will no overlap with existing solutions but will replace them adding value for the external end customer. Thus, the sourcing succeeded in finding an improving solution. But on the other hand, savings potential calculations were not made on a detailed level. A high level analysis showed that the new technology selected would not save money but be necessary from the viewpoint of customer satisfaction even though monetary benefits could not be seen. The problem in evaluating the savings potential was to find the baseline: Should the new material handling and packaging technology be compared with the current solution that is no longer feasible? The result would have been no savings at all. Or should the new technology be compared with manual material handling and packaging necessary to fulfill end customer

requirements? In the latter case, savings would be significant. The latter calculation was not made on a detailed level. Thus, a neutral score was given on question 5.

A similar problem was faced with question 6 that seeks for potential savings in the operative purchasing. In this case, standardized products and efficient ordering channels enhance operative purchasing but again, a calculation was not made. The fact the selected supplier is existing with whom practices are already standardized, generate the biggest savings potential, as a so-called supplier orientation phase is not needed. If a completely new supplier was chosen, orientation phase would have required more time and resources. Another reason for not making a savings calculation is that the product itself is customized with irregular demand meaning each order is handled separately.

As a conclusion, it can be said that the generic model can be used to evaluate an agreement that is negotiated on the basis of existing frame agreement where the case originates from external end customer requirements. Problems may arise when detailed calculations are needed to answer certain types of questions (such as, savings potential related to new product and service solutions). Thus, it can be concluded savings potential scale is not always a suitable method to analyze effectiveness of sourcing as in some cases savings may simply not be available or customer requirements have to be fulfilled regardless of the price. This seems to be unrelated to the agreement type in question.

Case B: Electricity purchasing (outsourcing)

In Case B, the electricity supply of Nokia was outsourced. Distribution of electricity is basically divided into two: firstly, there is the transfer side of the electricity often taken care of by multinational companies. Secondly, local electric companies take care of the local distribution to end users ("the last mile"). The supplier selected in Case B operates in Europe and generates, distributes, sells electricity and heat, and provides energy services. For the company, the main source of electricity is Nord Pool, The Nordic Power Exchange, that is a commodity exchange for electric power. The participants of Nord Pool trade power through the exchange and Nord Pool is their counterpart (Nord Pool web).

The case originates from the deregulation of the electricity markets in the European Union (EU) since 1997. The European market is changing as in some countries the electricity markets are already open and subject to competition, and in some countries reforms will take place in compliance with an EU directive. In general, the changes have meant price reductions for consumers, cost reductions, and an increasing level of mergers and consolidations. Consumers

now have a greater choice of supplier than before that has led to changes in the selling structure and models. The directive obligates the member states to open the market for competition (Foratom report). Thus, Nokia felt the current mode of electricity purchasing that involved number of locally managed suppliers (local distributors) was not suitable. In this case, the trigger for electricity sourcing did not come from customer's side alone but instead the sourcing organization with the customer saw an opportunity in the electricity market. The customer participated the sourcing process from the beginning and was active in determining the specifications and defining the needs. From the buyer's viewpoint, the agreement covers the whole electricity purchasing starting from purchasing electricity from the exchange and ending with managing the relationship with local distributors. The supplier, who was selected to manage the initial electricity purchasing and transferring, manages also the local distributors and, for example, no invoices are sent from local distributors to the buyer but directly to the electricity transferor.

Electricity as commodity is very interesting and it cannot be categorized explicitly in the purchase portfolio matrix: Electricity as such is strategically important commodity for almost any company but on the other hand, the buyer is not tight with a particular supplier but instead, changing suppliers is easy (especially in deregulated markets). The assumption in the purchase portfolio is that strategic items have high supply risk and high profit impact. Thus, electricity may be placed on the lower-right corner in the matrix presenting leverage items with low supply risk and high profit impact. It may as well be part of non-critical items in the portfolio.

Based on the evaluation, the sourcing process received altogether 74 points giving an average of 4,11 points. Thus, the process can be said to be effective. In the following, the most successful phases and on the other hand the phases with most improvement potential of the case are briefly discussed.

Highlights of the process (where the highest score was given) include a thorough analysis of the market supply, as six companies that have experience in operating in the electricity exchange, participated the process and were analyzed. During the determining specifications phase, innovative service solutions were identified and used later on to make the detailed request for purchase. Thus, newly required market information was utilized immediately. Another detail to be highlighted is that the supplier selection supports the overall strategy of the company as well as sourcing strategy. Further, the pricing model was carefully analyzed and eventually it was decided to buy electricity on the market price available in the electricity exchange. As the

supplier is competent to generate, distribute, and sell electricity, it can be trusted the best available price is guaranteed, and the supplier invoices accordingly. Other options would have been, for example, to make a fixed price agreement of electricity purchasing or to manage purchasing from the electricity exchange oneself. The process additionally succeeded very well in managing the practical arrangements of the operative purchasing process (e.g., elimination of local supplier management and invoice handling), managing the risks and deviations during the operative purchasing, taking care of the implementation related activities, and having an agreement that supports the desired depth and permanence of the supplier relationship.

The sourcing process was not as successful with respect to having a well-structured request for purchase allowing a simple comparison between suppliers and to using company's generic agreement template with standard terms and conditions. Both can be said to originate from the innovativeness of the purchasing mode in question. Earlier electricity was bought locally from local suppliers who were managed by Nokia's local offices. With the new model, Nokia has just one interface (supplier) that is responsible for purchasing electricity from the exchange as well as managing the relationship with local electricity distributors. Due to innovativeness, several RFP's were sent to suppliers in order to gain more knowledge of the market supply. Each RFP round had fewer participants than the other. Even though it was not possible to have a single, unambiguous RFP, this inefficiency was justified as new information was gained enhancing to reach a better agreement at the end. Due to similar reasons, the generic terms and conditions were not used, as the purchase model was completely different from the earlier approach. Additionally, an agreement template for such approach did not exist, and on the other hand, legislation limits the opportunities to use highly special terms and conditions in electricity purchasing. Finally, the TCO model was not used to analyze the long-term effect of different quotations as suggested by the evaluation model.

As a summary, the generic sourcing process evaluation model can be used to evaluate an outsourcing case even when a completely new service concept is in question. The only exception found during the case analysis was the implementation of the TCO model, as the TCO approach was not found suitable for this particular sourcing process. Still, we would argue the TCO analysis could have been appropriate even though not selected in this case. Thus, as the TCO model is generic in nature and also as electricity purchasing might not be a typical commodity in the operating resource area, it can be argued the generic evaluation model is applicable in a service outsourcing case.

Case C: Travel agency services

The travel branch in general is interesting. It is to some extent a spot market where prices change daily and purchases are done fast. According to a generic definition, a spot market is "a market in which commodities, such as grain, gold, crude oil, or RAM chips, are bought and sold for cash and delivered immediately" (InvestorWords web pages). For example, air flight prices can change even during a day. Business traveling is a special area in the travel branch. For most companies, traveling and travel agency services are essential in order to manage business even though traveling as such is not critical for, for example, the production. Thus, travel agency services represent non-critical items in the purchase portfolio. In many cases, business traveling within a company is specified, and individual travelers travel according to pre-defined rules and policies. Many times, the customers (business units) within the company are typically not able to define in exact terms the travel services they need but instead, the sourcing organization determines the specifications.

The trigger for the case of travel agency services was expiration of current agreements with suppliers who provide travel agency services. At the starting point, there were more potential suppliers than eventually selected because none of the suppliers was able to provide a fully satisfying service package. For the same reason, an agreement was eventually done with two suppliers. The both two suppliers who were selected in Case C are local companies offering a wide variety of travel related services to companies as well as individuals in a geographically limited area. Services include, for example, airline, hotel, and car booking, and other travel related arrangements and services. The agreements negotiated apply locally. This particular sourcing case was given a total score of 75, which averages 4,17. In the following, some of the phases of the sourcing process are briefly discussed.

First of all, sourcing succeeded especially in identifying the most potential suppliers and giving each an equal chance to participate the bidding even though the number of potential suppliers was limited. This is due to buyer's size and demanding travel related service requirements. None of the local suppliers was able to provide a comprehensive service package in all areas of travel agency services. Secondly, sourcing was equally successful in determining the supplier selection criteria allowing the number of suppliers to go down during the process as suggested in question 7. The third success area was due to support to strategies. The strategy of the sourcing organization as well as company's overall strategy were used as a baseline in supplier negotiations. Fourthly, sourcing succeeded in analyzing the price structure of the services.

Fifthly, the generic agreement template with terms and conditions were utilized to the extent possible. The procedures for operative purchases were considered on a detailed level, which is the sixth success area of this sourcing case. In addition to generic legal terms and conditions, the agreement defines, for example, the ordering modes, payment methods, and other practical arrangements necessary for the operative purchasing of travel agency services. The seventh success area is related to managing potential risks and deviations during the operative purchasing. Among other definitions, the agreement specifies the agreed service level and measures for it. Similarly, other areas of potential risks and deviations are specified in the agreement. Finally, the agreement was successful in considering flexibility in case of changes in the environment.

There were few areas where the travel services sourcing was not equally successful as in the areas described above. Firstly, mainly due to the characteristics of travel services, a written sourcing request cannot be received from the customer. For travel services, there are as many potential end users in the company as there are employees. Naturally, all end user requirements cannot be considered but the company defines generic terms for traveling. On the other hand, the business units are often not able to specify in detail their travel services needs as stated earlier. Accordingly, the sourcing organization itself determined the specifications. Thus, in a sense the customer had made a sourcing request with specifications but in practice the sourcing had the strongest effect on the specifications. Secondly, innovative service solutions were not offered by any of the suppliers.

There were two questions (5 and 6) that did not apply fully to the case of travel agency services. Thus, the scores given do not give a comprehensive view on the effectiveness of the sourcing process (a similar finding was made with other cases under analysis, too). The last area with improvement potential relates to sending of the RFP's. In order to have comparable quotations from all suppliers, after receiving the quotations against the first RFP, another request had to be made.

As a conclusion it can be said that the generic model can be used to evaluate sourcing processes related to travel agency services. These services can be seen as a generalized example of services that in many cases do not involve a physical product. The case in question may or may not involve a physical delivery of a product (such as, a flight ticket). Furthermore, the travel services case can be seen as an example of sourcing organization driven, not customer driven, sourcing case.

Case D: E-learning solutions services

E-learning refers to electronic learning that according to a definition "covers a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet, audio and videotape, satellite broadcast, interactive television, and cd-rom" (ASTD web pages). Learning solutions can be placed on the area of non-critical items in the purchase portfolio.

The starting point of the sourcing process in case of e-learning solutions was to harmonize the supplier and agreement base. The situation earlier was that there were many suppliers whose management was scattered in the business units around Nokia. Each business unit had their own e-learning providers whose capabilities varied. During the sourcing process, a number of suppliers were analyzed and identified to be potential for future business. Eventually more than one of them were approved and an agreement was negotiated with each. Thus, the case is not a typical sourcing case where the supplier scanning and other activities start from scratch but instead, the supplier base already existed even though it was very scattered and not managed company-wide. Additionally, a typical sourcing case would have ended with an agreement with one supplier only (Weele 1994) but in this case, a wider approach was selected, as a single-source solution was not applicable. This is due to characteristics of the learning solutions branch where suppliers are often small-sized and highly specialized in providing certain type of learning solutions. The purpose of the sourcing process was to find a supplier to provide content for certain learning solutions, not a technical platform.

To summarize, the sourcing process was completed with more than one supplier but for the purpose of this study, only one is as analyzed in details. The selected case is discussed in the following. The supplier of Case D offers implementation of pedagogical concepts that vary from self-study packages to intensively facilitated sessions. The supplier concentrates on delivering technological training content. The selected supplier is a small-sized company who intends to grow strongly. The supplier had earlier business with Nokia and thus, it was known in advance.

In Case D, a frame agreement was reached between Nokia and a supplier who delivers training by utilizing e-learning solutions. Case D is the only case in this study that aimed at a frame agreement. The frame agreement defines generic terms and conditions for delivering various e-learning projects. Each assignment (a so called project order) is negotiated separately, and the supplier and the business unit in question agree special characteristics of the assignment. But

generally, the project order relies on the frame agreement. Thus, one of the key benefits for both the seller and the buyer is a simplified process to agree on individual assignments. In the case being discussed, there is no physical delivery and product involved but instead the completed learning solution will be placed on a server where individuals can study the content.

Based on the evaluation, the sourcing process received altogether 75 points giving an average of 4,17 points. Thus, the process was effective. In the following, the most successful phases and on the other hand the phases with most improvement potential of the sourcing process are briefly presented.

The sourcing process was especially successful in the areas presented in the following. First of all, new learning solutions were identified during the RFI process. Secondly, the specifications determined enhance the operative purchasing process, which is this case refers to creating the project orders when specific e-learning solutions are needed by a business unit. The frame agreement, for example, has a project order and project plan templates to be used. The third success area refers to using supplier evaluation criteria that allowed efficient reduction in the number of suppliers during the process. The number of suppliers under consideration was reduced significantly between the phases of sending the RFI and the RFP. Fourthly, the selected supplier and the agreement type are in line with strategies of the company.

The fifth success area relates to pricing. Pricing is basically based on scaled hourly fees but allows individual assignments to use a fixed price model if it is found more suitable for a specific project. The area of purchasing e-learning solutions is relatively new and involves human labor, which makes price breakdown calculations challenging. Also due to frame agreement characteristics, the intention was not to define a fixed, inflexible price. Sixthly and seventhly, the process succeeded in using company's agreement templates and defining practical arrangements for the operative purchasing (which again refers to making project orders). The last two success areas are flexibility in case of changes in the environment and support for the desired depth of the supplier relationship. The agreement gives flexibility as, for example, there are no limits (min, max) in the number of project orders. The only risk the buyer faces are involved with the project orders. Finally, long-term relationship with the supplier was achieved that was the baseline for the sourcing process and frame agreement negotiations. The supplier is committed to continuous development of e-learning solutions that is Nokia's intention, too.

There was also some room for improvement in the sourcing process. Firstly, improvement potential and added value of the e-learning solution was not analyzed in monetary terms in

comparison with the earlier situation (question 5). But on the other hand, a calculation of potential savings would have been artificial, as open questions exist. For example, should comparisons be made between consolidated and fragmented e-learning supplier base? Or perhaps consolidated e-learning solutions and traditional classroom training solutions should have been compared? As mentioned earlier, the baseline for sourcing was a fragmented supplier base that provided various kind of e-learning solutions and thus, the concept was not new anymore. Overall, what should have been included in such a savings potential calculation? Additional value is evident with e-learning solution services but as savings potential was not calculated, a low score was given. Basically, a score of zero (0) should have been given but instead, the answer shows a score of one (1; strongly disagree) that cannot be said to be completely truthful.

Secondly, the TCO analysis was not done completely. The analysis was based on the ideas of TCO but there were no resources to make it complete. The third theme, where a relatively low score was given, relates to supplier selection criteria and their weighting. The selection criteria were agreed in cooperation with the information management group that is responsible for providing e-learning solutions but the end customers (business units) did not participate directly. Instead, the information management group had collected feedback and expectations from the business units whose input were indirectly considered in supplier selection.

Conclusion of Case D suggests that the generic sourcing process evaluation model can be used for a case that intents to reach a frame agreement. The case involves both services and products (software) and thus, it can be concluded the generic model can be applied in such a case, too.

Case E: Hardware recycling services

Case E was based on clear business need: a number of personal computers and other office hardware are replaced monthly and unused material need to be disposed. The particular case was chosen for further analysis for several reasons. First of all, it combines services and delivery of physical products (even though deliveries take place backwards, from users to the supplier). Secondly, the service concept is new for the company and thus, thorough analysis were made in order to identify the best recycling service solution. Thirdly, the service line in question has been operational for a longer period of time and thus, it was not possible to choose a "traditional" sourcing case as only minor changes are made regularly to existing agreements. A full-scale sourcing process takes place seldom.

Recycling is a relatively new and challenging service concept. Challenges include, for example, pricing of the service as value of recyclable materials vary significantly. Thus, service providers

often price their services case by case depending on the goods to be recycled. Recycling service, as most operating resources, belongs clearly to non-critical items in the purchase portfolio.

At the starting point, the buyer did not have a permanent nor unified solution for disposing office hardware that is no longer used. Recycling was arranged on ad hoc basis meaning every office site or area ordered recycling from local companies in case of need. Typically, a need arose when enough office hardware was collected in the buyer's premises. The practices were fairly unorganized. In the agreement negotiated, the supplier for the service concept is responsible for collecting the materials from buyer's premises and managing their disposal in an environmentally friendly way. The supplier who was selected is a global company providing office hardware and related services. A frame agreement existed between Nokia and the supplier and thus, the particular agreement is based on the earlier negotiated frame agreement.

Altogether the recycling services sourcing case was evaluated to be worth 75 points, which means an average score of 4,17. In the following, the most effective phases of the sourcing process are presented. Later the phases with most improvement potential are discussed.

First of all, the specifications of the service concept were determined in cooperation with the customer. The customer in this case is a global organization responsible for information technology infrastructure. As the customer is global, it can be said that customer requirements were aligned, and the service concept can be implemented in all countries in a similar way as the service provider has global operations, too. The customer did not specify their business need in a formal way but the need and specifications were determined in several discussions between the customer and the sourcing organization. Secondly, the most potential suppliers were identified in the market, and altogether nearly ten suppliers were analyzed. As a starting point, the intention was to find a global supplier that limited the number of potential suppliers significantly. Thirdly, the supplier evaluation criteria enabled to make efficient and justified decisions during the supplier selection sub-process. The criteria were agreed together with the customer even though the criteria were not given a weight stating the relative importance of each criterion. The criteria included, for example, supplier's processes, geographical coverage, security, environmental aspects, and deployment plan. These were well documented.

Fourthly, the process succeeded especially when the support to strategies is evaluated. Fifthly, the pricing structure was analyzed carefully. As mentioned, pricing of recycling services is difficult and thus, the buyer relies completely on the information supplier provides regarding recyclable material. For example, in some cases materials used in the office hardware might be

of high value resulting the supplier to pay on buyer's account. But in another case, the materials may be low-valued and the buyer would pay to the supplier. As this is the case, the pricing model is complicated and as mentioned, price is determined for each recyclable batch based on the data given by the supplier. Other pricing models were considered, too, but found non-applicable.

The sourcing process was also successful when the use of generic terms and conditions is evaluated. This is mainly due to the existing frame agreement where such terms were already agreed. During the sourcing, arrangements related to operative purchasing were defined on a very detailed level including, for example, terms of payment, responsibilities for packaging, picking, and notification of delivery. The potential risks and deviations during the operative mode were also agreed and defined with baselines, measures, and consequences. Finally, the agreement provides flexibility with already-agreed checkpoints.

Some room for improvement during the process was also identified. For example, the suppliers did not offer innovative product and service packages but instead, they all offered a rather similar recycling concept. This may be due to comparative newness of the service itself. Second area that could have been done differently relates to the improvement potential related to the new service. In this case, intuition based evaluation suggests there is a lot of improvement potential in comparison with the current ad hoc mode of operation, as a harmonized solution for disposal of unused materials did not exist earlier. Thus, the service does not overlap with existing solutions. But as the savings potential was not calculated, a low score was given in question 5. This, of course, is not reasonable for the case under evaluation but it is coherent with the "rules" specified in the questionnaire. But as a conclusion of the empirical part, it seems reasonable to modify questions 5 and 6. In this sourcing case, the operative purchasing process is likely to improve but it was not verified in terms of money resulting in a relatively low score (question 6).

Thirdly, the quotations were not analyzed based on the TCO model even though some TCO aspects were included. Finally, in some degree the objectives of the buyer and the supplier differ. From Nokia's point of view, the agreement is successful in terms of desired depth and permanence of the supplier relationship but the supplier may have a lightly different opinion. Thus, the last question was evaluated to receive a neutral score.

To conclude Case D, the generic evaluation model seems to be applicable when a case with products and services is in question (even though the goods move "backwards"). Case D supports also the earlier conclusions that the model can be used to evaluate a case where an

earlier negotiated frame agreement exists. However, there were difficulties in evaluating those arguments in the model that required a calculation based on, for example, savings in the operative purchasing phase.

5. Conclusions

In this chapter, the conclusions based on the empirical section are discussed. First, the generic conclusions of the sourcing process evaluation model are made. Then the changes suggested in the model are presented. Finally, the limitations in the usage of the evaluation model are explained.

5.1 Applicability of the model

In this study, the evaluation model was created based on findings in the literature combined with factors found important in the practical sourcing. For this purpose, several sourcing managers were interviewed. The generic model was tested with five sourcing cases, and the conclusions are based on the analysis of these cases. Even though the number of analyzed cases is not high, it seems reasonable to draw certain conclusions based on the empirical study. Conclusions are based on a qualitative analysis, as a quantitative approach was not seen applicable due to, for example, characteristics of the sample data and subjective nature of the questions in the evaluation model.

The results of the study bring a new aspect to evaluating the "big picture" related to the sourcing function. Instead of measuring the success of the order function only (in terms of, for example, delivery accuracy or number of purchase orders issued), the effectiveness of the sourcing process itself can be measured. This measurement can be performed prior to any operative purchasing activities as soon as the agreement is finalized. The sourcing process evaluation adds value itself even though the most concrete and measurable results can be seen only after operative purchasing activities take place.

As introduced briefly in the summary of the evaluation model, the model can be used for several purposes. It can be used for evaluating a sourcing case after the sourcing activities have taken place. Thus, information of the effectiveness of a particular case can be achieved. Additionally, the person responsible for the sourcing process can use the model for self-evaluation (it is also possible to use the model when the person's performance is analyzed by his/her superior). Additionally, the results of several analyses can be used to identify process development or training needs in general. Further, the information collected in the questionnaire can be used to communicate the business benefits and added value achieved at the end of the sourcing process. Finally, the model can be used to set targets for the sourcing organization and for individual

sourcing cases. For example, more emphasis can be put on a certain area, such as, finding innovative solutions. Innovative solutions are likely to be found especially if the RFI process is given a high order of importance. As noticed in the case analyses, an effective sourcing process supports finding innovative business models and processes (e.g., Case B). These solutions are likely to add value to both parties resulting in a win-win situation. Thus, as the model gathers the most critical phases of the sourcing process, it seems fair to suggest that using the model for planning purposes gives support for more effective sourcing processes. Consequently, an effective sourcing process has potential to improve the business processes of both the seller and the buyer.

Based on the empirical study, it seems to be possible to build a generic model to evaluate sourcing processes in the area of operating resources. The evaluation model seems to suit for various types of sourcing cases, which is supported by several factors. The reasoning for these conclusions is argued in the following.

First of all, the cases in the empirical part varied from pure outsourcing case to a case where delivery of products is combined with services. Even though most cases concerned services, it seems reasonable to conclude it is possible to evaluate operating resource sourcing processes using a generic model. The total score given on different cases varied surprisingly little even though such different cases were chosen for the empirical study. This may come from unified objectives of the sourcing managers responsible for the activities if they are committed to similar processes and objectives. Interestingly, when arguments were grouped into three sections based on sourcing sub-processes, there were no big differences between total scores and averages each case received. The scores seem to follow a pattern as shown in Appendix 4. However, a conclusion of the applicability of the model can be drawn based on the sample studied.

Second, the evaluation model was tested with both frame agreements (Case D) and so-called case agreements (e.g., Cases E and A). Based on the case study, there seems to be no limitations in using the same model for both types of agreements. The main difference between the agreement types is in the details determined. Typically a case agreement has a more detailed level of specifications in comparison with a frame agreement. For example, it may be difficult to evaluate the improvements and potential savings related to the operative purchasing if a frame agreement aims to define terms and conditions on a generic level. Further, it is possible to leave specifications open in a frame agreement on purpose for future case agreement negotiations. For

example, in Case D the baseline for pricing was determined but deviations are allowed in individual case agreements.

Third, the generic model seems to be applicable regardless of the starting point or innovativeness of the purchase. Starting points in the cases studied varied from external customer requirements (Case A) to a need for harmonization (Case D) and to self-identified business potential (Case B). The driver for the sourcing case seems to make no difference (whether the case is driven and specifications determined by customer needs or by sourcing as noticed in Case C). Neither there seems to be no importance of the innovativeness of the products and services in question, but the model can be applied to innovative as well as more traditional type of purchases (for example, Case A vs. Case B).

Fourth, the cases studied in the empirical part varied widely in the geographical scope. For example, the intention from the beginning was to find a global supplier with globally available services in Case E. But on the other hand, Case C aimed at choosing a local supplier. Thus, based on the samples studied the fourth finding is, it is possible to use a generic sourcing process evaluation model regardless of the geographical scope of the sourcing case.

Fifth, the generic model seems to be applicable in sourcing cases where the intention is to reach an agreement with one supplier only (Case A) but as well in cases where the intention is to negotiate with a number of suppliers (Case D). Even though cases, like Case A, are more common and discussed in the basic sourcing framework, we would not limit the generic evaluation model to be applicable for one-supplier cases only. Baselines for sourcing vary and in this respect, the same model can be applied.

Sixth, it seems that the generic evaluation model can be used to evaluate cases that do not fall implicitly to the non-critical items category in the purchase portfolio. By default, operating resources are non-critical items with low supply risk and low profit impact. This is not the case, for example, with electricity purchasing, as electricity can be seen critical for business. Even though it could be argued in which section on the purchase portfolio certain products and services belong to, it seems reasonable to conclude the model is applicable even though the product or service in question would not be typically operating resources.

Finally, the model was tested with cases where operations take place on fixed-price but on the other hand on varying-price environment. In a sense, price can be seen fixed in Case A type of cases but prices vary much in cases such as E. However, it was possible to evaluate the process

in both types of cases. A conclusion can be made a generic evaluation model seems to apply to different kind of pricing models as pricing related arguments are presented on a general level.

The intention was to build a model to evaluate operating resource sourcing processes. Based on the sample data, it seems to be possible to create such an evaluation model. The applicability of the model in case of direct sourcing can be discussed. Even though it was not tested with any direct sourcing cases, there seems to be no obstacles to applying the framework also in direct sourcing. Probabilities exists some modifications and changes in emphasis of subjects are needed but generally the framework seems to be applicable. In the basic model, all subjects are treated equally, i.e., they are not given a weight to illustrate their mutual importance. However, before applying the model to a direct sourcing case, a more thorough analysis on the possible modifications and weighting is to be made.

In this study, the sourcing processes were evaluated in full from determining specifications to negotiating the agreement. It may be possible to utilize the model also in sections as arguments have been grouped accordingly to the sourcing process. Thus, in case the intention is to negotiate for improvements in the agreement terms and conditions only, the last section of the model may be applicable. In such a case, the specifications would already exist and the supplier would already be operating. This type of approach was not studied but most likely price related arguments would be included, too. However, users of the model should be careful to detach arguments from the context.

5.2 Changes to the original model

In total, the questionnaire seems to fulfill the requirements to evaluate a sourcing process for operating resources. However, based on the empirical study and gained experience, some changes were done in the evaluation model. These changes are argued in this paragraph, and they are summarized in Appendix 5.

The most obscure questions to be answered by the interviewees were questions 5 and 6. They both required an objective, numerical value that in some cases were not available even though evaluated qualitatively or on a general level. Thus, a low score was given to a particular sourcing case. However, reasons for generally low scores in questions requiring an exact numeric value can be speculated. It may be difficult to come to a single value stating savings potential and thus, it may be easily bypassed in the sourcing. It is not reasonable to conclude that the persons responsible for the sourcing process had not considered neither added value related to new

products and services nor operative purchasing improvements important (in terms of money). As an excuse to the cases analyzed in the study, it can be said most of them had done some sort of calculations even though a clear answer was not available in questions 5 and 6.

For most cases, it was not clear what the baseline is against which the new concept and specifications should be compared. The baseline is easy to determine when the sourcing aims to find a totally new product or service concept that will change, for example, delivery and inventory management practices. In such a case, it is fairly straightforward to analyze the improvement potential in terms of money. But, for example, in a case where new technology is taken into use (such as packaging technology presented in Case A), it is not unambiguous what should be used as baseline: Should the baseline be the existing packaging technology that is automatic but not technologically adequate anymore? Or should the baseline be manual packaging that would be needed if a replacing technology was not found? The same question arose when the e-learning case (Case D) was analyzed: Should the baseline be current e-learning solutions that are to be harmonized or traditional classroom training?

Due to this confusion, questions 5 and 6 will be split. The first half of both questions will be subjective and are to be answered on a similar scale to the other questions (Strongly agree – Strongly disagree). Thus, a sourcing case can be evaluated to have been effective in improving the logistics arrangements even though a financial calculation to prove this was not done. Additionally, a fourth section will be added to the evaluation model aiming at analyzing the financial perspective. These financial questions that represent the financial perspective of the BSC can be answered whenever applicable. The second half of questions 5 and 6 will be moved to a new section as questions 19 and 20. The fourth section presents pure financial perspective and can be answered objectively unlike the other questions that are subjective in nature. The subjective questions adduce the other three perspectives of the BSC.

Additionally, a minor adjustment will be made in question 9, and re-usability will be added to the examples of the TCO model. Price itself comprises the current purchase price and related costs but at the end of the product life cycle, differences in re-usability and re-sale prices can vary. These will be highlighted in the examples.

5.3 Limitations

The evaluation model can be used and generalizations can be made for those cases where the sourcing process is complete (from determining specifications to agreement negotiation). But if the sourcing strives for changes in, for example, agreement terms and conditions or other issues that can be considered minor, the model does not apply. In such a case, the model may be partially used as it has been divided into three (four) sections accordingly to the sourcing process. But as mentioned, such a partial use is to be done carefully.

In some respects the model does not provide a comprehensive view on the success of sourcing. For example, there could be legislative restrictions in certain areas and thus, it would not be possible to strive for the same objectives as a case without any restrictions. Or in some cases, the buyer might produce an innovative RFP and thus, the suppliers would not suggest any other innovative solutions. However, such limitations can be seen minor especially when the whole sourcing process is under evaluation.

In the practical use of the model, target values are to be defined case by case in the company. The generic model presented and tested in the study does not include any target values as they vary considerably depending on the sourcing case. For example, the targeted financial improvements in the operative purchasing cannot be stated definitely in a way they would apply to all future cases. When the model is taken in to use, target values are to be defined.

A related limitation is that two cases cannot be compared with each other especially if the baselines and objectives of the cases have been very different (for example, reason for case start-up, product/service innovativeness or simply the nature of the products and services to be purchased). Thus, comparisons are not recommended based on results of the generic model especially when target values cannot be determined objectively and the cases represent two clearly different areas in operating resources (naturally it is possible to exclude certain questions in the comparison to improve comparability of two cases). However, comparisons are not recommended.

The subjective nature of the questions can also be seen as a limitation in the applicability of the model. The aim was to find measures that could have been answered objectively. But as seen in the empirical study, objective questions (the financial perspective) were found difficult to be answered with a single numeric value. Thus, some questions were split into two. However, it may be possible to formulate the subjective questions in a way they support objective evaluation even better than the current model. For example, question 9 ("The quotations were analyzed

based on the TCO model, and all aspects of the TCO were considered with long-term cost effect") could be re-formulated as the example shows below:

Which of the following TCO aspects were considered in quotation analysis:

price	☒
quality	☐
delivery	☒
service	☒
management	☐
communications	☐
TOTAL (score)	3

With this approach, it could be possible to receive more objective and more comparable answers when sourcing processes are evaluated.

6. Summary

In this final chapter, the study and its findings are summarized.

6.1 Purpose of the study

The purpose of the study was to find measures to evaluate the effectiveness of the sourcing process. Even though literature frequently discusses the measures that can be used to evaluate the operative purchasing process, there is not much research on the measures of the sourcing process that generates the basis for the operative purchasing. Thus, the measures of the sourcing process were selected as a research problem.

The study is limited to the area of operating resources. Operating resources are by definition items and services not used directly in the production and not purchased for selling. Operating resources are characterized by low supply risk and low profit impact placing such items and services in the lower-left corner on the purchase portfolio introduced by Kraljič. Usually, specificity and number of purchase items are high, consumption rate is low but irregular, and user's influence on the choice of the product can be remarkable. Thus, the sourcing process aims to, for example, standardize products, improve ordering channels, and make invoice handling more efficient. On this basis, a generic evaluation model was created to evaluate the effectiveness of the sourcing process. The evaluation model was constructed on the basis of the sub-processes of sourcing that are determining specifications, supplier selection, and agreement negotiation.

6.2 Theoretical findings

In this sub-chapter, the most meaningful theoretical findings as well as the evaluation model formulated are recapitulated.

Operating resources are typically placed in the lower-left corner of the purchase portfolio. The portfolio that was presented in Figure 2-1 has two dimensions: supply risk (availability) and profit impact. The main factors determining item's location on the supply risk dimension are number of suppliers and their geographical distance that are able and willing to supply a particular item. Profit impact on the other hand is mainly determined by the buyer's current purchase volume as well as forecast of the future. Based on the model, it is possible to categorize items and formulate the purchasing strategies accordingly.

Operating resources are referred to also as indirect materials, consumable items, non-production related products (NRP) services as well as maintenance, repair and operations (MRO) goods in the literature. Items belonging to operating resources include, for example, actual MRO supplies necessary to support production and service operations, office products (consumable supplies, small equipment and so on), and small capital goods. Typically these are bought in small quantities from local suppliers. Thus, the main objective is to manage purchasing, ordering, and invoice handling as efficiently and cost-effectively as possible. Means to achieve these include, for example, consolidation of sourcing and purchasing in order to utilize company's negotiation power. An interesting phenomenon related to operating is maverick buying that is common due to number of purchase items and number of purchase orders submitted. Maverick buying is the opposite of standardized purchasing process where people order items from non-contracted suppliers outside the established process. Commonly the buying organization ends up paying more for goods and services than they should as pre-approved suppliers who are under agreement to sell products at a negotiated price (that usually includes a volume discount) are not used.

The sourcing process consists of three sub-processes that are sequential: determining specifications, supplier selection, and agreement negotiation. These were discussed in detail in Sub-chapter 2.2. In the phase of determining specifications, the buyer specifies the purchasing requirements including, for example, functional, technical, and logistics specifications. Next, information on the market supply is collected and eventually, the supplier is selected based on pre-defined criteria. Finally, in the phase of negotiating the agreement, details on are agreed with the selected supplier. The sourcing process is followed by the supply process (the order function) consisting of ordering, expediting and evaluation, and after-care and evaluation.

The balanced scorecard (BSC) provides a comprehensive view on measuring and thus, it was chosen as a framework for measuring sourcing. The BSC balances short- and long-term objectives and the "hard" objective measures and "softer", more subjective measures. There are four perspectives that are financial, customer, internal business processes, and learning and growth. In generic terms, the financial perspective defines the financial performance expected from the strategy and on the other hand serves as the focus for the objectives and measures in the other scorecard perspectives. Customer perspective is included in order to incorporate customers' expectations in the measurement. The measures of internal business process focus on those processes that have the greatest impact on satisfaction and achieving the objectives of the organization. Finally, the learning and growth perspective is to provide means to close gaps

between current and future state on the financial, customer, and internal business process perspectives.

Similarly to the BSC methodology, the evaluation model for the sourcing process built in the study incorporates several perspectives. The model was generated based on findings from literature as well on experience of professional sourcing managers. In order to build the model, the sourcing process was analyzed and the most critical phases from the viewpoint of effective sourcing were identified. Based on the identified phases, measures to evaluate the process were generated. The evaluation model was divided into three sections accordingly to the sub-processes of sourcing. In the original evaluation model, most arguments were subjective in nature and to be answered on a scale from "Strongly agree" to "Strongly disagree" (scores 5 to 1). Some questions required a numeric value on the same scale. Due to subjectivity of the model, it is important that the person (persons) evaluating the sourcing process is able to analyze the situation objectively and thus, the answers given reflect the reality.

As mentioned, the evaluation model is divided into three sections. As six phases were identified to be the most critical in each sub-process, altogether 18 arguments were incorporated in the model. In case of *determining specifications*, the critical phases involved receiving a clearly specified sourcing request from the customer, aligning customer requirements, finding potential suppliers, identifying new solutions on the market, gaining additional value from the new product and/or service concept, and supporting enhancements in the operative purchasing process. From the viewpoint of *supplier selection* sub-process the critical issues included supplier evaluation and selection criteria, quality of the RFP, analysis of the quotations, support to company's strategies, pricing model analysis, and cooperation with the customers. Finally, from the area of *agreement negotiation*, six areas that were identified the critical from the viewpoint of effective sourcing: using company's generic agreement template with terms and conditions, managing risks of the operative purchasing, defining arrangements for the operative purchasing, considering implementation related activities, managing risk related to changes in the environment, and finally sharing a common understanding of the future activities and business.

6.3 Empirical findings

The empirical part of the study was made for Nokia Operating Resource Sourcing (ORS). Nokia ORS is responsible for the strategic sourcing and purchasing of Nokia's operating resources including development of processes and tools that support these activities. The target of Nokia

ORS is to consolidate Nokia-wide purchasing volumes and to ensure more efficient use of resources. The case study was implemented via interviews of sourcing managers. In order to test the sourcing process evaluation model, five sourcing cases were selected carefully to represent the wide area of operating resources.

Based on the case studies in the empirical section, the conclusion is made that it is possible to use a generic model to evaluate the effectiveness of sourcing processes. The conclusion is supported by the fact that the model is tested with various cases. For example, the cases analyzed vary from pure outsourcing to a case where delivery of products is combined with services, and both frame and case agreement situations are analyzed. Additionally, the geographical scope of the sourcing cases vary largely, the number of agreements negotiated during one sourcing process vary from one to many, there are various types of pricing models in use and so on. Still, it was possible to evaluate the sourcing processes using the same model. Thus, the conclusion was made it is possible to use a generic model to evaluate the effectiveness of sourcing processes even though the scope of operating resources is wide.

As a result of the empirical study, the financial perspective was separated from the other questions. Thus, the modified model has four sections instead of three as in the original model.

Some limitations were identified in the applicability of the model. First, generalizations apply only for a sourcing case that is complete (consisting of determining specifications, supplier selection, and agreement negotiation). Second, in some respects the model does not provide a comprehensive view on the success of sourcing. For example, there could be legislative restrictions in certain areas and thus, it would not be possible to strive for the same objectives as a case without any restrictions. However, such limitations can be seen minor. Third, in the practical use of the model, target values are to be defined case by case in the company. Fourth, two cases cannot be compared with each other especially if the baselines and objectives of the cases are very different. Thus, comparisons are not recommended based on results of the generic model especially when target values cannot be determined objectively. Finally, the subjective nature of the questions in general could be seen as a limitation in the applicability of the sourcing process evaluation model.

6.4 Recommendation for further studies

This study has concentrated on evaluating the effectiveness of the sourcing process. To analyze the process further its efficiency could also be measured, i.e., how well are the chosen tasks done in terms of resource utilization. Thus, for example, efficient use of resources during the sourcing process could be evaluated. Efficiency evaluation could be combined with effectiveness analysis, or the evaluation could be done separately.

It would also be interesting to investigate the expectations that the operative purchasing has on the sourcing process. In other words, what those decisions and actions during the sourcing process are that add most value for the operative purchasing. Another further study could concentrate on those business benefits of agreements that materialize in the operative purchasing process. This would include, for example, analysis on the benefits of electronic tools.

As speculated earlier, the evaluation model could be tested in the case of direct sourcing, too. On a high level, the differences are not expected to be massive even though differences are likely to be found. One of the reasons is that direct sourcing goods and services and operating resource goods and services are usually categorized differently (for example, in the purchase portfolio) creating dissimilar objectives for sourcing.

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Abbreviations used in the study (in alphabetical order)

BSC	Balanced scorecard
CRM	Customer relationship management
EU	European Union
EUR	Euro, currency
JIT	Just-in-time
MRO	Maintenance, repair and operations (overhaul)
NET	Nokia Networks
NMP	Nokia Mobile Phones
NRC	Nokia Research Centre
NVO	Nokia Ventures Organization
ORS	Operating Resource Sourcing
RAM	Random access memory
RFI	Request for information
RFP	Request for purchase
TCO	Total cost of ownership
TCP	Total cost of purchase
T&M	Test and measuring
4C	The model of four C's

A questionnaire to evaluate a sourcing process

Attributes	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Section 1: Determining specifications					
1. Customer has clearly defined, analyzed, and documented the business need and provided a written sourcing request to the sourcing organization for approval.	1	2	3	4	5
2. Specifications have been agreed in cooperation with the customer enhancing alignment of current and future needs of (several) business units. *The specifications include functional, technical, logistics, maintenance, and commercial specifications. Aligned requirements may allow reaching new customers.*	1	2	3	4	5
3. The most potential suppliers were identified and thus, the supplier scanning and selection for further analysis were made trustily. All participants were given the same opportunity to participate, i.e., there were real choices that are treated equally during the process. *In the supplier scanning, the most potential suppliers were considered for the analysis. The specifications were determined in a way they did not rule out potential suppliers without justification. The most potential suppliers received a Request for information (RFI).*	1	2	3	4	5
4. New solutions (products/services/service packages) available on the market were identified during the phase of determining specifications. *A request for information (RFI) was sent to several suppliers who offered among standard solutions innovative technological solutions and service packages. The market supply was scanned thoroughly.*	1	2	3	4	5
5. The specified products/services do not overlap with existing solutions but add value in comparison with the current product/service portfolio. This improvement potential has been evaluated in terms of money. Potential savings scale: <10% - 20 - 30 - 40 - >50%; give score respectively. *Examples: Firstly, in-house expertise has been analyzed in order to identify existing (and possibly overlapping) capabilities.* *Additional value may be gained through new technological solutions, a new service concept such as vendor managed inventory, changes in the total cost of ownership, improved processes, and resource allocation. Added value is evaluated in terms of money. If added value is not evaluated, no score is given.*	1	2	3	4	5
6. The specifications (especially the logistics and maintenance specifications) support improvements and efficiency in the operative purchasing process. Potential savings scale: <5% - 10 - 15 - 20 - >25%, give score respectively. *Examples: The operative purchasing can be improved via standardized products/service, electronic purchase catalogue, efficient ordering channels, automated invoicing, use of purchase cards, and so on. If improvements were not evaluated, no score is given.*	1	2	3	4	5

Section 2: Supplier selection

7. Supplier evaluation has been made with such criteria that eliminate suppliers during the process efficiently to minimize the workload and maximize the benefits. *For example, information was requested from a number of suppliers (RFI phase). Further, a RFP was sent to max 50% of the suppliers identified in the original market/supplier base scanning. Further, max 50% of the received quotations were analyzed based on TCO model. Thus, the criteria furthers supplier selection.*	1 2 3 4 5
8. Supplier selection: The Request for purchase (RFP) was clearly structured, and the questions were limited, unambiguous, and simple to answer enabling the sourcing organization to receive quotations from all bidders in a similar, comparable format (thus, objective supplier selection is possible). *To answer the question, you could consider how many adjustments, clarifications, or corrections had to be made to the RFP during its period of validity? Scale: very many - many - several - few - none (give score respectively).*	1 2 3 4 5
9. The quotations were analyzed based on the TCO model, and all aspects of the TCO were considered with long-term cost effect. *The TCO aspects include price, quality, delivery, service, management, communications, and after-sales activities.*	1 2 3 4 5
10. The selected supplier and agreement type support company's overall strategy and is in line with the sourcing strategy. *Examples: The selected method of contracting out (decision on the scope of outsourcing) and the agreement type are in line with the strategies (for example, if the strategic intent is to reduce number of suppliers, the selection is made among existing supplier base).* *The selected supplier complements current suppliers and thus, is suitable for the supplier base.* *The agreement type is in line with the products/services in question.*	1 2 3 4 5
11. The pricing model has been carefully evaluated and it supports the chosen purchase method. *Supplier's cost structure has been thoroughly analyzed and understood. It has been possible to make a price breakdown calculation based on supplier's data. Pricing model related risks are understood and communicated internally, and the risk can be managed (e.g., by using a price ceiling).* *The product/service specifications were finalized with enough details before sending out a Request for purchase giving suppliers a chance to analyze the pricing and requirements.*	1 2 3 4 5
12. The final supplier selection criteria and their mutual weighting were agreed in cooperation with the customer(s) who were fully aware of the criteria. *Selection criteria has been listed for all specification types. The supplier was selected based on these pre-defined criteria. Improved customer satisfaction can be expected.*	1 2 3 4 5

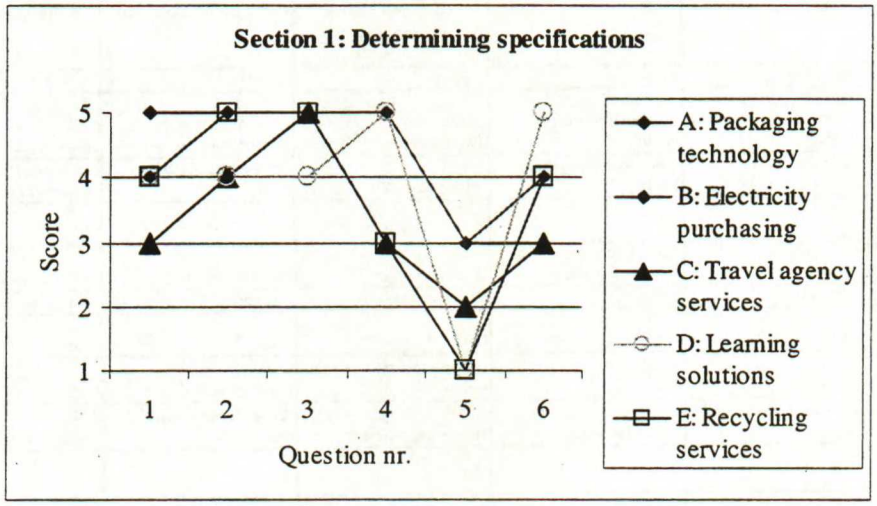
Section 3: Agreement negotiation

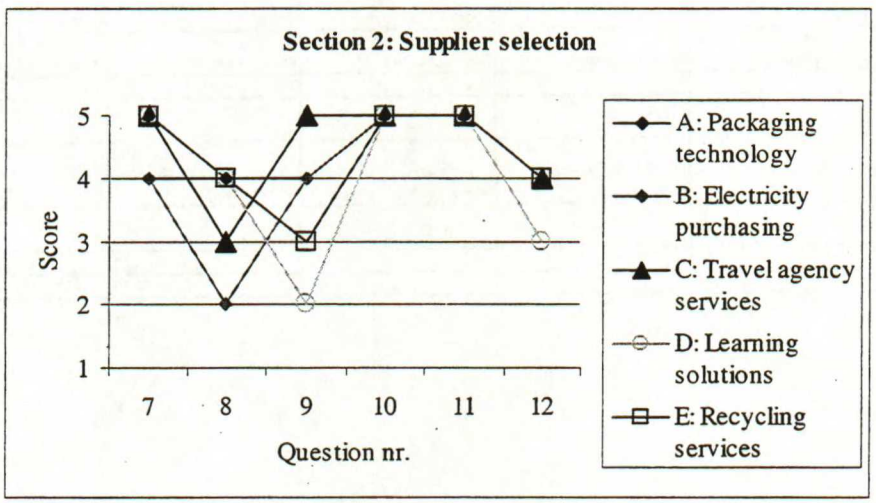
13. Company's generic agreement template with terms and conditions are used in the agreement. Scale: <20% - 40 - 60 - 80 - 100% (give score respectively).	1	2	3	4	5
14. Practical arrangements during the operative purchasing have been considered and defined as detailed as possible. *Examples: terms of payment, terms of delivery, batch sizes. Details may vary depending on the agreement scope.*	1	2	3	4	5
15. The agreement manages potential risks and deviations from agreed during the operational purchasing process. *Possible operational risks and deviations include, e.g., quality and quality monitoring; delivery times and delivery monitoring; customer service and problem solving; compliance with terms&conditions; security issues; ownership of intellectual property rights (IPR); and pricing. Baselines, measures, and consequences against such deviations have been defined (consequences have been proportioned with the risk of related deviation).*	1	2	3	4	5
16. Implementation related activities have been considered during the sourcing process. *For example, the following implementation related issues are considered: how the new agreement is communicated to customers and individual users, what the communication methods and tools are, how well the users are aware and committed to the new agreement (and the new supplier), and what the corrective actions are if the new agreement is not taken into use as planned.*	1	2	3	4	5
17. The agreement provides flexibility in case of sudden changes, e.g., in the environment or market situation. For this purpose, control points have been agreed.	1	2	3	4	5
18. The agreement supports the desired depth and permanence of the supplier relationship. *The customer, the sourcing organization, and the supplier share a common understanding of the future needs and views enabling continuance of the relationship. Future business plans, objectives, and potential have been communicated and evaluated when applicable.*	1	2	3	4	5
Total					

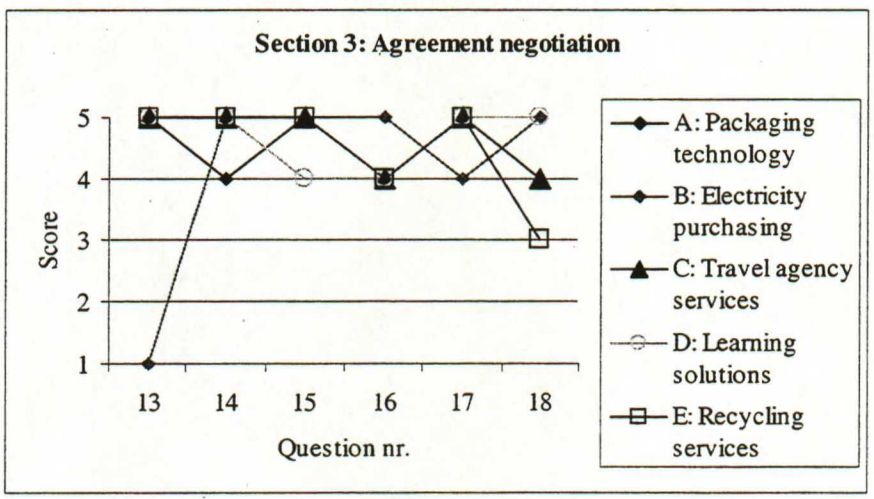
Summary of the cases in the empirical study

	A: Packaging technology	B: Electricity purchasing	C: Travel agency services	D: Learning solutions	E: Recycling services
Sourcing process					
Length of the process	almost 2 years	4 months	7 months	4 months	9 months
Reason for the process start-up	Customer requirements, new technology	New service concept identified	Expiration of current agreements, need for update	Harmonization of the supplier and agreement base	Business need
Customer(s)	Product programs, manufacturing plants	Nokia Real Estate and Facilities	All business units	Several internal business units	Nokia Business Infrastructure
Selected supplier					
Supplier	Existing supplier, new for the product	Existing supplier, new for the service concept	Existing supplier	Existing supplier	Existing, new for the service
Branch of the supplier	Electronics	Energy	Travel services	Multimedia	Information technology
Supplier's geographical presence	Global	Multinational (European)	Local	Local	Global
Importance of the supplier for the buyer (in the particular case)	Single source	Single source, easily replaceable	Multiple source (not easy to replace)	Multiple sources	Single source
Main reason for the supplier selection	Technically & commercially satisfying	Market knowledge	Service completeness	Service completeness, continuance	Supplier capabilities
Agreement					
Coverage of the agreement	Equipment, services	Service concept (outsourcing)	Service package	Learning solutions (service)	Service package including products & services
Scope of agreement	Global	Multinational	Local	Global	Global
Type of agreement	Case agreement (based on a frame agreement)	Basic agreement	Basic agreement	Frame agreement	Case agreement (based on a frame agreement)
Continuity	Yes	Yes	Yes	Yes	Yes
Products/services					
Importance of the products/services	Strategic (can be replaceable but long timeframe)	Leverage but strategic importance	Non-critical (but necessary)	Non-critical	Non-critical
Score					
Total score	80	74	75	75	75
Average score	4.44	4.11	4.17	4.17	4.17

Graphical representation on the scores of the cases







Changes to the original evaluation model

Attributes	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Section 1: Determining specifications					
5. The specified products/services do not overlap with existing solutions but add value in comparison with the current product/service portfolio. *Examples: In-house expertise has been analyzed in order to identify existing (and possibly overlapping) capabilities. Additional value may be gained through new technological solutions, a new service concept such as vendor managed inventory, changes in the total cost of ownership, improved processes, and resource allocation.*	1	2	3	4	5
6. The specifications (especially the logistics and maintenance specifications) support improvements and efficiency in the operative purchasing process. *Examples: The operative purchasing can be improved via standardized products/service, electronic purchase catalogue, efficient ordering channels, automated invoicing, use of purchase cards, and so on.*	1	2	3	4	5
Section 2: Supplier selection					
9. The quotations were analyzed based on the TCO model, and all aspects of the TCO were considered with long-term cost effect. *The TCO aspects include price, quality, delivery, service, management, communications, and after-sales activities. Also re-usability can be evaluated.*	1	2	3	4	5
Section 4: Financial perspective *The following questions are answered whenever applicable. They relate closely to earlier questions (number in brackets).*					
19 (see question 5). The specified products/services do not overlap with existing solutions but add value in comparison with the current product/service portfolio. This improvement potential has been evaluated in terms of money. Potential savings scale: <5% - 10 - 15 - 20 - >25%, give score respectively. *Additional value may be gained through new technological solutions, a new service concept such as vendor managed inventory, changes in the total cost of ownership, improved processes, and resource allocation. Added value is evaluated in terms of money. If added value is not evaluated, no score is given.*	1	2	3	4	5
20 (see question 6). The specifications (especially the logistics and maintenance specifications) support improvements and efficiency in the operative purchasing process. Potential savings scale: <5% - 10 - 15 - 20 - >25%; give score respectively. *Examples: The operative purchasing can be improved via standardized products/service, electronic purchase catalogue, efficient ordering channels, automated invoicing, use of purchase cards, and so on. If improvements were not evaluated, no score is given.*	1	2	3	4	5
Total					